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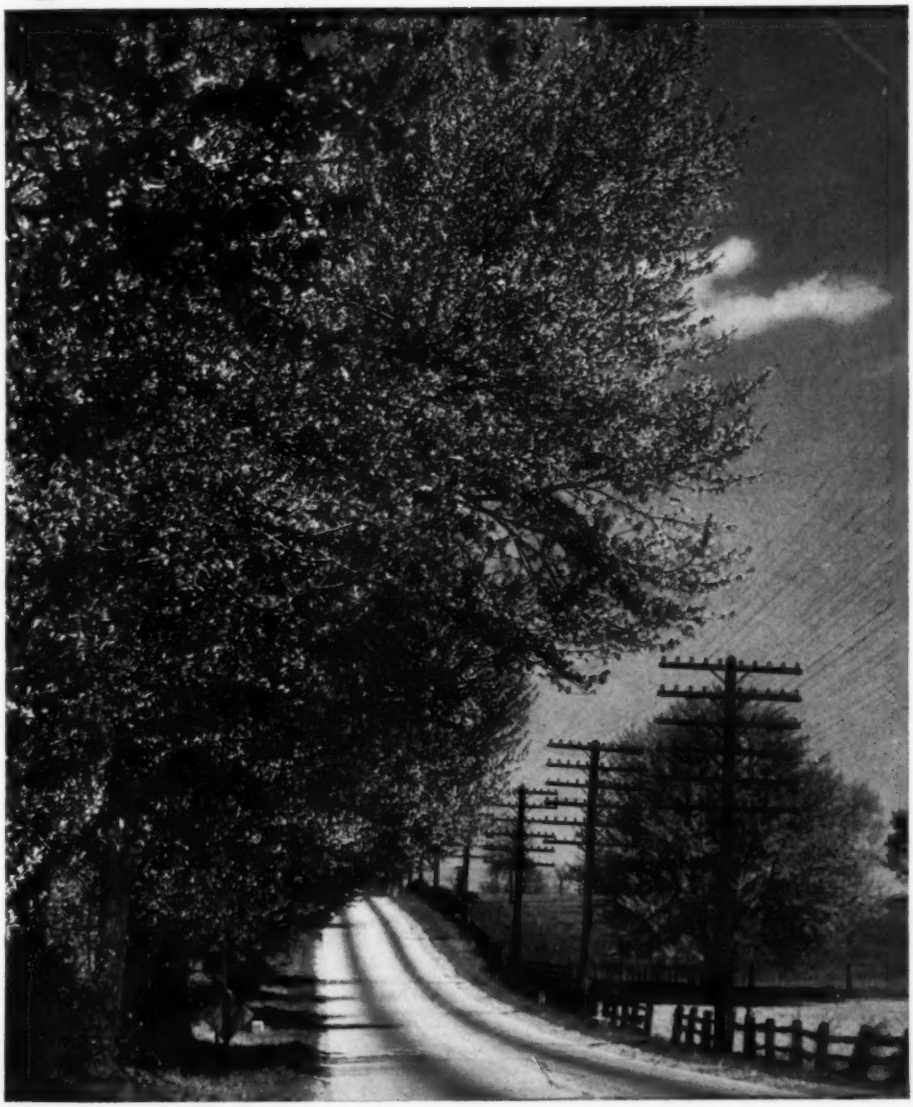

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Editorial Office: 1155 16th Street, N. W., Washington 6, D. C.

VOLUME XXXV NO. 4

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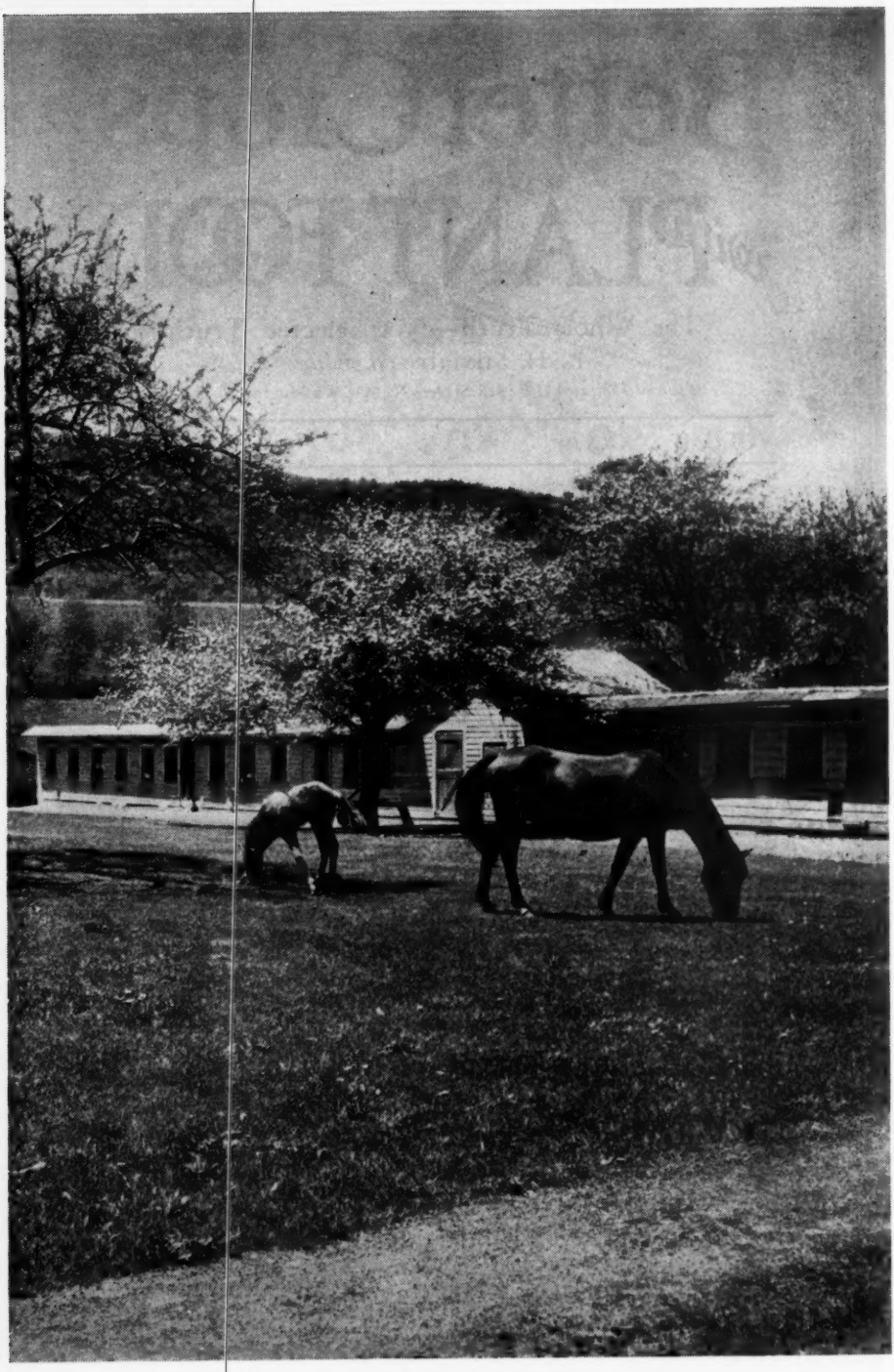

Springtime

Better Crops with PLANT FOOD

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VOL. XXXV WASHINGTON, D. C., APRIL 1951 No. 4

Our Uncle Sam is . . .

Calling All Crops

Jeff McDermid

WHAT the book of tactics is to armed forces resembles those rather comprehensive production guides for farmers to use in 1951. The defense assignment handed to the soil gentry is simply to use discretion in conserving land resources at a time when the target set up to shoot at is a five per cent increase in agricultural output over 1950 and three per cent greater than the all-time record crops of 1949.

All this and much more were brought up with forceful resolve at the Iowa "corn-vention" early in April. Bawling calves and squealing pigs reinforced the clarion call for crops issued by state and federal farm leaders. Nothing irks a good all-around general farmer more than to hear his "critters" crying for sustenance without being able to fork out the provisions. To be "short on the shorts" is a real dilemma not only for the feeder himself, but for the distant and often misled food consumer who relishes juicy steaks and ample hamburger and bacon.

We who can look back with reminiscent mien to laissez-faire eras are able to see quite a difference in the way farmers take hold of the planting program. Possibly excepting a few feed crops, it was then customary for the shrewdest operators to sit back and size things up in the late fall prior to the spring seeding. They noted carefully what crops and livestock were being somewhat overdone in comparison to the local demands. If hogs were a sort of drug on a weak market, they made plans to increase their own farrowings for the coming season, in the firm belief

that most farmers would drop out of hogs in considerable numbers, which might mean a pretty good market price the next year. On the contrary, if hogs were scarce and firmly priced, such wiseacres shook their sage heads and resolved to go easy on their litters for awhile. In the crop annals of those times the same method prevailed for cash crops like potatoes, flaxseed, sugar beets, and beans. It was each man for himself and the drought take the hindmost!

WE don't need to add that some farmers follow this practice quite generally still. Yet there really has been a decided drift to a more business-like way of approaching the production problem in advance. This year there are 10 major crops listed in the so-called guide for plantings. The 1950 acreage to all these crops amounted to 212 million. This year the guide book and the organized leadership afield agree on trying to plant 224 million acres to the same crops.

If old methods and attitudes prevailed these days we could just fold our hands and deny that any power except weather and nature could either interfere or arrange for national and state acreages and goals of output. You'd say that no arguments or threats could drive the rugged individualist to open a furrow or breed a sow when he didn't think it would be sure to pay. In some aspects the same motive rules today, but it is obscured by history and a rather new "national concept" written into federal law. This new concept has taken deep roots and furnishes the financial incentive which greases the wheels of the united farm resolve.

All this ties right into the fact that every one of the 10 crops for which there is a call for increased production is definitely assured of a fairly profitable return to growers through the federal price-support program. Some of them will get this protection and assurance through indirect ways, but most of them receive guarantees of loans at storage time or outright government promises to purchase at some definite relation to parity.

So we see at once that the door to opportunity in agriculture is hinged to and swings with parity. You must go back to 1933 and 15-cent corn and 3-cent pork in order to be in at the genesis of parity. Now I am fully aware, just as you are, that we do not find all our good farmer friends amenable to and subscribers to this theory of the parity relationship. But the dissenters and unbelievers are almost as scarce as open-pollinated corn or walking cultivators.

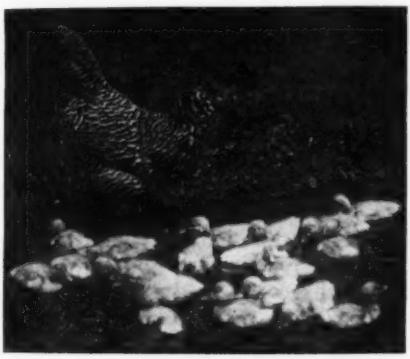
NOT very long ago I got a letter from a native of my bailiwick who raved no end about the "cussed foolishness" of economists and farm statisticians in their monthly itemizing of hundreds of farm prices and parity ratios. He belonged to the old school which still "keeps" in red frame buildings dotting the back country. With him, all forms of change and adjustment in agriculture are signs of decadence and regimentation.

Not only have the majority accepted the new mathematical farming and mechanical tillage philosophy, but the whole fabric of our "life with consumers" hangs on the thread of parity —which has been under some pressure of late.

The concept of parity had to be upheld fiercely back in 1933-35. Few consumers at the time paid much attention to the drifting flow of this portentous move. They were busy with their own evictions for unpaid rent and creeping paralysis of incomes. Food prices then were low and farmers were forced to burn corn for fuel and let mountains of wheat decay on the ground. It was in that tough oven that the parity concept was baked to the queen's taste. In spite of that, parity had its loud critics, more especially aimed at the financial method of underwriting parity prices by means of the processing tax system. Farm

defenders said in reply that benefit payments and parity formulas for agriculture were no different or no worse than the protective tariff—and they might have added the growing trend to hitch organized labor wages to the fluctuations of the living cost.

Anyhow, regardless of the arguments and the court decisions which threw dismay for awhile into the parity planning, the concept grew and expanded and blossomed. So today we have parity as the basic measure for what is deemed a fair share of the



national income for our farm workers. Of course, to be exact, prices and income for agriculture are not the same identical thing, but other things being equal, the price factor per unit of output still "shakes a mean leg" in the dance of destiny.

If some hopeful newcomers suggest that price control won't get very far unless you put parity away back in the deep freeze for a few years, the resulting heat wave is prodigious. Farmers who couldn't tell you how the federal figure foundry really digs up the parity figures each month are just as loud in support of the theory behind them as any "bureaucrat" whose days are spent behind a slide rule.

There will be a real debate on that issue. Many proposals will be made and many rejected. But there are some deeper considerations facing us at this juncture than a mere academic tussle over an economic theory. One great overpowering urge is uppermost—and that is production of a mammoth food and feed crop. Other angles of the situation diminish in importance before that one.

Neither the parity concept nor the escalator wage concept equals the national survival concept. Recent official statements warrant our feeling that our country is in grave danger. Families will be deprived of loved ones and communities will be insecure if that fate befalls us. Hence to squabble among ourselves about fifth-rate propositions and insist upon class and group privileges, no matter how just, or how well entrenched, are not true Americanism. I do not look to see either our labor or our farm leaders demanding adherence to slogans and traditions if we really must exert united power to survive.

IF that time has come, full energy must needs be used to conserve our resources and to channel equipment, facilities, services, and priorities to the loyal folks on our farms. So far, much of that effort has been feeble and at cross-purposes. Much of the Washington materials allocation business has been "business as usual." It was a kind of dream world, a make-believe effort without conviction or "guts." All this will change over night should the enemy knock at our gates.

Moreover, with a ruinous war on our hands the farmer's will to produce abundantly would be spiritual, personal, and overpowering. Prices would be plenty high enough, parity or none, so that given reasonable supplies and a broad interpretation of the essential industry idea in drafting manpower, his position would not be pathetic, hopeless, or discouraging.

As a matter of fact, this nation went through a few severe wars up to 1920 without any thought to farm parity. What hurt farmers worst was loss of their own kin and the depletion of their soils brought on by these wars.

(*Turn to page* 48)

Nutritional Problems of Peanuts in Southeastern Alabama

By Franklin L. Davis

Alabama Polytechnic Institute, Auburn, Alabama

THE results of cooperative field tests conducted during the last two years in southeastern Alabama on the effects of lime and gypsum on runner peanuts have disclosed some interesting facts concerning the nutritional needs of peanuts on the soils of that area. Chief among these are:

(1) Both the exchangeable calcium content of the soil and the shelling percentage are good indications of the need of calcium as lime or gypsum.

(2) Lime and gypsum treatments gave increases in the shelling percentage of peanuts on all soils on which they produced significant increases in yields.

(3) Responses in yield from lime and gypsum have been limited and sometimes prevented by insufficient potash supplied by the soil and fertilizer.

(4) The use of large amounts of potash in the fertilizer or sidedressings of additional potash resulted in decreased quality and yield of peanuts on the plots receiving no calcium.

Objectives of this work, in part, were to correlate the response of runner peanuts to lime with the calcium content of the soil and to determine the effect of lime and gypsum treatments on shelling percentage and kernel size. Specifically each test consisted of four replications of each of the following four treatments: (1) No lime or gypsum; (2) one ton per acre of lime; (3) 400 pounds per acre of gypsum dusted on the peanut foliage at early blooming stage; and (4) both lime and gypsum. Each test was fertilized according to the farm-cooperator's own practice.

The experiments are located on suitable experimental areas of selected farms. Soil samples were taken for soil analyses from each suitable site before the soil was limed. Soil reaction, lime requirement, exchange capacity, exchangeable calcium, and other analyses are made on the samples from each location. At harvest time, which is as near as possible to the date when the entire field is dug, the peanuts from a 100-square-foot area are dug, picked green, and weighed. A 500-gram sample from each plot is saved for drying, weighing, and shelling for determinations of yield of dry peanuts, shelling percentage, and percentage of sound mature kernels. Field data were obtained from 18 tests in 1949 and from 26 tests in 1950. Of the 26 tests harvested in 1950, 12 were begun in 1949 and 14 were new tests started in 1950.

Minimum Calcium Level

The statement that the exchangeable calcium content of the soil is a good indication of the need for lime or gypsum, since both these materials supply calcium, is almost axiomatic. Nevertheless, it is worthwhile to know the extent to which experimental data confirm this and to ascertain if there is a minimum level of calcium content below which peanuts would give a profitable response to lime and gypsum.

A summary of the 1950 data on yields and percentages of sound mature kernels in relation to exchangeable calcium content of the soil is given in Table I. The data in the table show that of the 26 soils tested, 12 had an exchangeable calcium content of less than 0.72 milliequivalents per 100 grams of soil and that the average increase in yield from lime and gypsum treatments on these soils ranged from 240 to 286 pounds per acre of dry peanuts. Of these 12 soils low in exchangeable calcium, only two failed to give an increase in yield of 200 pounds per acre or more to either lime or gypsum. Of the 14 soils containing more than 0.72 me. per 100 grams of exchangeable calcium, only one gave significant increases in yield (210 pounds per acre) to the lime and gypsum treatments. Thus the data indicate that exchangeable calcium content of soils is a good index of the need of peanuts for additional calcium as lime or gypsum.

The response in yield of peanuts to applications of lime and gypsum is somewhat better than that shown in Table I if no reference is made to the soil properties. Twelve of the 26, or 41 per cent of the tests harvested in 1950, gave increases of 200 pounds per acre or more of cured peanuts from 400 pounds per acre of gypsum (land plaster) dusted on the foliage. The average increase in yield of these 12 tests was 342 pounds per acre from gypsum and 300 pounds per acre from lime. Of the 32 different farm locations tested in the two years, four gave increases in yield from gypsum that exceeded 600 pounds per acre of peanuts.

The larger increases in yields were obtained from the soils that produced peanuts having lower shelling percentages. Thus, summarized in Table II are the data on yields and increases in percentage of sound mature kernels (SMK) in relation to the percentage of sound mature kernels produced on the plot receiving no calcium.

The data in Table II show that peanuts having a percentage of sound

TABLE I.—SUMMARY OF THE 1950 DATA ON YIELD AND PERCENTAGE OF SOUND MATURE KERNELS OF PEANUTS IN RELATION TO THE EXCHANGEABLE CALCIUM CONTENT OF SOILS.

Treatment	Exchangeable calcium content of soils expressed as $CaCO_3$					
	Less than 720 pounds per acre of lime (12 soils)		720 to 900 pounds per acre of lime (6 soils)		900 and more pounds per acre of lime (8 soils)	
	Average yield/A	Average increase/A	Average yield/A	Average increase/A	Average yield/A	Average increase/A
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
No treatment	1,361	check	1,515	check	1,497	check
Lime	1,601	240	1,537	22	1,517	20
Gypsum	1,644	283	1,605	90	1,571	74
Lime & gypsum	1,647	286	1,559	44	1,551	54
	SMK	Inc. SMK	SMK	Inc. SMK	SMK	Inc. SMK
	%	%	%	%	%	%
No treatment	58.9	check	63.3	check	62.0	check
Lime	64.2	5.3	66.0	2.7	62.2	0.2
Gypsum	63.9	5.0	66.1	2.8	63.3	1.3
Lime & gypsum	65.2	6.3	66.3	3.0	64.5	2.5

TABLE II.—SUMMARY OF THE 1950 DATA ON YIELD AND PERCENTAGE OF SOUND MATURE KERNELS OF PEANUTS IN RELATION TO THE PERCENTAGE OF SOUND MATURE KERNELS PRODUCED ON THE PLOT RECEIVING NO CALCIUM.

Treatment	Percentage of sound mature kernels on untreated plot					
	SMK less than 60% (10 soils)		SMK 60% to 65% (10 soils)		SMK 70% and over (6 soils)	
	Average yield/A	Average increase/A	Average yield/A	Average increase/A	Average yield/A	Average increase/A
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
No treatment	1,331	check	1,442	check	1,610	check
Lime	1,589	258	1,504	62	1,607	−3
Gypsum	1,588	257	1,583	141	1,704	94
Lime & gypsum	1,635	304	1,645	203	1,453	−147
	Average SMK	Average inc. SMK	Average SMK	Average inc. SMK	Average SMK	Average inc. SMK
	%	%	%	%	%	%
No treatment	55.3	check	63.1	check	66.6	check
Lime	61.8	6.5	64.4	1.3	67.1	0.5
Gypsum	61.5	6.2	65.3	2.2	67.1	0.5
Lime & gypsum	64.4	9.1	66.3	3.2	65.1	−1.3

mature kernels of less than 60 per cent were produced on the plots receiving no calcium on 10 of the 26 tests harvested in 1950. The average increase in yield from lime and gypsum treatments on these 10 soils ranged from 258 to 304 pounds per acre of peanuts. The average increase in percentage of SMK from the same treatments ranged from 6.5 per cent to 9.2 per cent. The increases in yield are about the same as those obtained from the group of 12 soils low in exchangeable calcium and shown in Table I. It is to be expected that the increases in percentage of SMK from lime and gypsum treatments are larger for the "low" group in Table II because in this case they were grouped on the basis of percentage of SMK.

Of the 18 tests harvested in 1949, three had a percentage of sound mature kernels on the untreated plot of less than 61 per cent and gave an average increase in yield from gypsum of 484 pounds per acre of peanuts. Seven fell within the limits of 61 to 69.9 per cent SMK on the untreated plots and gave an average increase in yield of 113 pounds per acre. The other 10 had percentages of SMK of above 70 per cent and produced an average increase in yield from gypsum of only 26 pounds per acre of peanuts. The data for the two years, 1949 and 1950, are not suitable for a combined grouping on this basis since the average grade, or percentage of SMK, of peanuts produced differed considerably with the two seasons.

These data show that both the exchangeable calcium content of the soil and the grade or percentage of sound mature kernels are good indications of the need of additional calcium applications in material such as lime and gypsum. The exchangeable calcium is a laboratory method of diagnosis and requires collecting representative soil samples. The percentage of sound mature kernels is given in the market grade and is associated with light peanuts having a high percentage of "pops" and "blow-outs." Practically

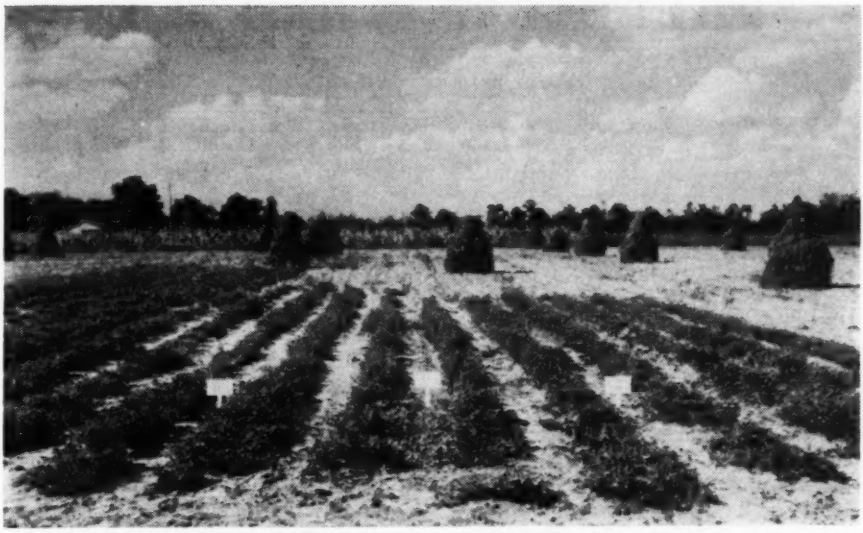


Fig. 1. Showing little or no response of peanuts to boron and manganese in addition to potash on an over-limed soil. Photographed September 18, 1950. Treatments: two center rows no-treatment check; two rows on left, 100 pounds muriate of potash plus 25 pounds manganese sulfate per acre; two rows on right, 100 pounds muriate of potash plus 5 pounds borax per acre.

all farmers know which fields and areas of their farms produce such peanuts.

The finding in this work that the yields of peanuts are limited by "available" potash indicates the best possibilities for future progress of investigations of the nutritional needs of runner peanuts on soils of southeastern Alabama. It was apparent in the data for 1949 that the yields of peanuts were

Fig. 2. Showing marked response of peanuts to zinc and an A-Z mixture in addition to potash on an over-limed soil. Photographed September 18, 1950. Treatments: two center rows, no treatment; two rows on left, 100 pounds muriate of potash plus 15 pounds zinc sulfate per acre; two rows on right, 100 pounds muriate of potash plus 5 pounds borax, 5 pounds copper sulfate, 15 pounds zinc sulfate, and 25 pounds manganese sulfate per acre.

TABLE III.—VALUES FOR CORRELATIONS EXISTING IN 1949 DATA

Relationship	Linear constants		Correlation	
	Intercept (a)	Slope (b)	Coefficient (r)	Significance
Yield of no-treatment plots to exchangeable calcium	1,404	0.27	0.247	N.S.
Yield of no-treatment plots to "available" potash*	860	9.27	.597	Sig.
Yield of gypsum-treated plots to "available" potash*	1,014	8.77	.680	Highly sig.

* "Available" potash = exchangeable soil potassium plus potash in fertilizer in pounds per acre of K_2O.

not closely related to the exchangeable calcium content of the soils. The calculation of the correlation coefficient (r) of only 0.247 for this relationship showed this to be true, although the yields ranged from 639 to 2,216 pounds per acre of peanuts and the exchangeable calcium contents from 0.44 to 1.60 me. per 100 grams of soil. The values for this relationship of yields to exchangeable calcium and for the relationships between yields and "available" potash are given in Table III. The term "available" potash refers to the sum of exchangeable soil potassium and that supplied in the peanut fertilizer.

The data in Table III show: (1) That the yield of peanuts was not significantly correlated to the exchangeable calcium content of the soils; (2) that the yield on the plots receiving no lime or gypsum was significantly correlated to the available potash; and (3) that the correlation between yield of peanuts on the gypsum-treated plots and available potash was highly significant. These facts and the knowledge that potassium is an essential plant-nutrient element commonly deficient in these soils show that potassium is more important than calcium as a factor limiting the yields of peanuts on these soils. This is further indicated by the fact that the eight soils that produced the largest yields on the gypsum-treated plots in 1949 included the seven tests that were largest in total available potash, i.e., exchangeable potash plus the potash applied in the fertilizer.

The data on a number of tests plainly showed that insufficient potash not only limited the yields of peanuts but on some of the tests completely prohibited any response to lime or gypsum. The pertinent data from two of such tests are given in Tables IV-A and IV-B. These two tests were located on different fields of the same farm in Houston County.

As shown by the data in Table IV-A, the soils were so similar that (with the

(*Turn to page* 45)

TABLE IV-A.—ANALYSES OF SOIL SAMPLES TAKEN ON JANUARY 2, 1949

Soil property	Location number 18	Location number 19
Soil reaction—pH	5.3	5.3
Cation exchange capacity me./100 gm.	3.88	3.22
Exchangeable calcium me./100 gm.	0.48	0.49
Exchangeable potassium p.p.m. K	19.6	21.7
NH_4F—soluble phosphorus p.p.m. P_2O_5	86.8	52.7

More Corn at No Extra Cost[1]

By A. C. Caldwell

Division of Soils, University of Minnesota, St. Paul, Minnesota

ON the Richard Clayton farm in Mower County, Minnesota, more than 15 bushels more corn per acre were obtained from the same amount of fertilizer simply by increasing the stand of corn. Doubling the plant population from two stalks per hill (7,840 plants per acre) to four stalks per hill (15,680 plants per acre) increased the yield from 100 pounds of fertilizer by 15.2 bushels. These are findings which, to a greater or less extent, would be true probably on many farms growing corn. Of the many factors which affect the growth of corn, two at least are pretty largely under the control of the operator, and these are the stand of corn and fertility of the soil. An examination of the effects of varying stand and fertilizer application to corn on a number of soil types over a period of several years in Minnesota has demonstrated that more attention to these two factors alone may affect appreciably the yield of corn obtained. Some of the details of how yield and ear characters may vary on different soil types with varying stand and fertilizer rate are presented here.

Sandy Soils

Sandy soils are apt to be drouthy and sometimes infertile, but will still produce fair yields of corn at times. Because of the risk of running out of moisture, too heavy a stand of corn should not be encouraged on soils of light texture. Figure 1 presents the yield of corn obtained from various rates of planting and two rates of application of fertilizer on a Hubbard sandy loam. The fertilizer applied was 8-16-16 at rates of 100 and 200 pounds per acre placed in the hill at planting time. This soil contained nearly 200 pounds per acre of available phosphorus (adsorbed and acid soluble), and 60 pounds of exchangeable potassium per acre six inches.

It can be seen that on this soil, a sandy loam, the best yield was produced with a stand of three stalks per hill on a 40-inch spacing, equivalent to 11,760 plants per acre. Four and five stalks per hill proved too many for the moisture available. The 100-pound-per-acre fertilizer rate slightly more than paid for itself when applied to two stalks per hill, but it was not until the stand was increased that substantial returns were obtained. The second 100 pounds of fertilizer were not economical at any planting rate.

A look at the relative ear size as shown in Figure 1 illustrates that the best yields were not obtained from the largest ears. The size of ear from a stalk in a 3-plant hill will be smaller than that from a 2-plant hill but not a third smaller, and since there are more ears, the yield is greater. Table I presents the actual average size of the ears from the various plantings on the sandy soil.

Slightly better than a half-pound ear was secured from a 2-stalk stand but

TABLE I.—THE EFFECT OF STALKS PER HILL AND FERTILIZER ON THE AVERAGE SIZE OF THE CORN EAR (HUBBARD SANDY LOAM).

Treatment	Stalks per hill (40" x 40") 2	3	4	5
	Average ear size (ounces)			
None	7.5	6.1	5.1	3.5
8–16–16, 100#/A	8.2	7.1	5.0	4.0
8–16–16, 200#/A	8.5	7.2	5.1	4.0

[1] Paper No. 748 of the miscellaneous journal series, Minnesota Agricultural Experiment Station, St. Paul, Minnesota.

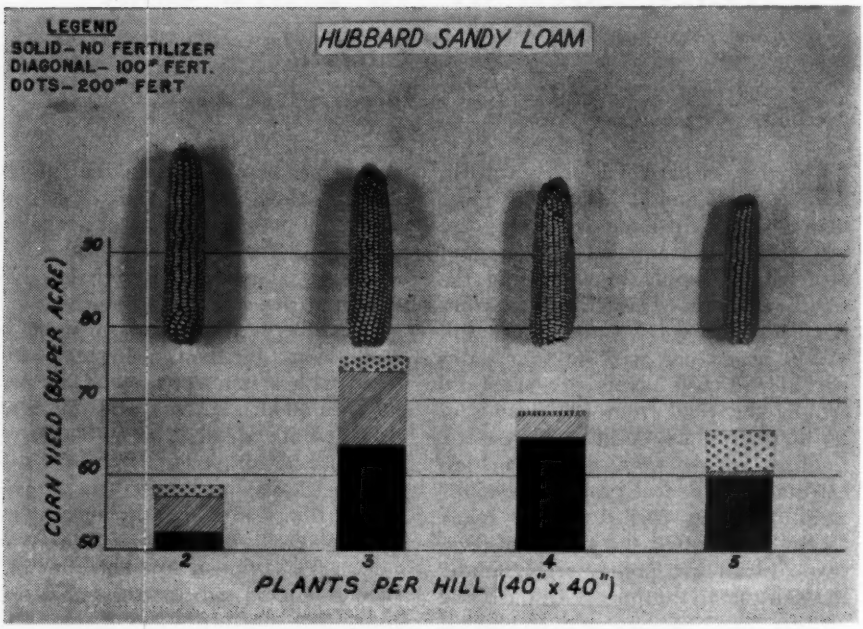


Fig. 1. Yields and relative ear sizes of corn from four rates of planting fertilized with 8-16-16 at two rates in the hill.

the best yields were obtained from ears that weighed about seven ounces.

Soil with Drouthy Subsoil

A stand and fertilizer trial was run on a soil called the Waukegan silt loam. This soil type is characterized by a variable depth of silt loam on the surface (30 inches or less) over gravel. This is a soil that does not produce too well when moisture is at all deficient. The surface soil on this field had just under 200 pounds of exchangeable potassium and 150 pounds of adsorbed and acid soluble phosphorus per acre six inches.

Figure 2 shows how yield and relative ear size were affected by varying stands and fertilization. Without fertilizer three plants per hill (just about 7,000 plants per acre) proved to be the optimum planting. When 100 pounds of fertilizer were applied, the stand could be increased by 3,500 plants and the best yield was realized. A stand of five plants per hill was too great, even with 200 pounds of fertilizer, because the yield was lower than from a 4-stalk stand which had been treated with 100 pounds of fertilizer. It is obvious that fertilizer was not worthwhile until the stand was increased sufficiently to use it.

The size of ear which gave best yields was the third smallest. The actual ear sizes obtained from the different stands and treatments can be seen in Table II.

TABLE II.—THE EFFECT OF STALKS PER HILL AND FERTILIZER ON THE AVERAGE SIZE OF THE CORN EAR (WAUKEGAN SILT LOAM).

Treatment	Stalks per hill (42" x 42") 2	3	4	5
	Average ear size (ounces)			
None	5.8	4.6	3.6	2.8
8–16–16, 100#/A	6.3	4.8	4.5	3.4
8–16–16, 200#/A	6.7	5.1	4.7	3.6

The ear size that gave maximum yields was a small one to be sure, about 4½ ounces. This is certainly not a robust ear, but with the variety used and under the conditions that prevailed on this field at the time of the

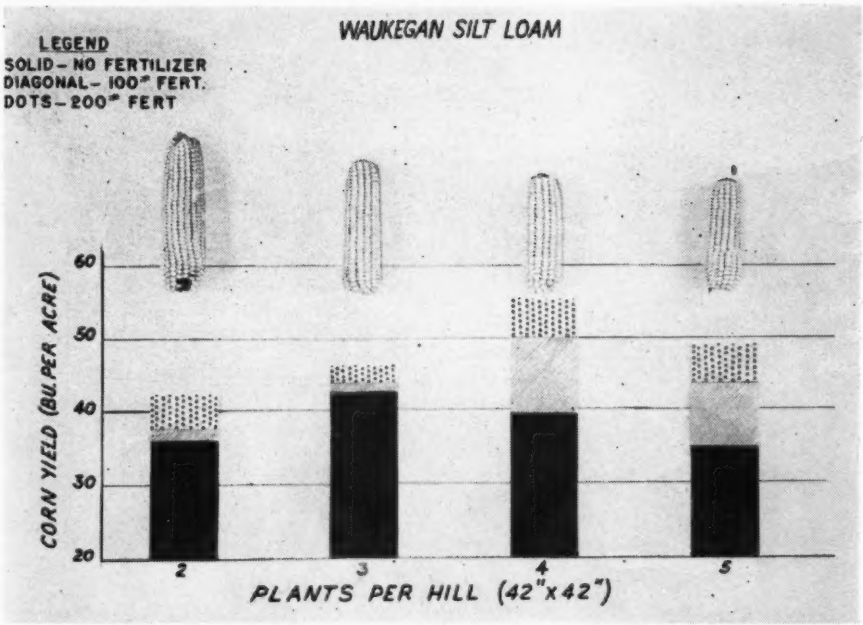


Fig. 2. Yields and relative ear sizes of corn from four rates of planting fertilized with 8-16-16 at two rates in the hill.

trials, this proved to be the optimum ear size.

Moderately Heavy-Textured Soil

Better yields can be obtained usually from the heavier-textured soils. Figure 3 presents the yields and relative ear sizes of corn grown on a Kenyon silty clay loam. This soil has a silty clay loam subsoil as well as surface which indicates a soil of good moisture-holding capacity. The acid soluble and adsorbed phosphorus was just under 150 pounds, and the exchangeable potassium 160 pounds per acre six inches.

Figure 3 shows that four and five stalks per hill fertilized with 200 pounds of fertilizer gave essentially the same yield. Since the 5-stalk stand was not superior to the 4-stalk in yield, the latter would be preferable because less moisture would be necessary to maintain the plants. This field is an example of one which had adequate moisture but was quite deficient in nutrients. An increase of more than 20 bushels of corn was secured from 100 pounds of fertilizer in the hill applied to a 4-stalk stand. The second 100 pounds of fertilizer also paid for itself handsomely with this population.

TABLE III.—THE EFFECT OF STALKS PER HILL AND FERTILIZER ON THE AVERAGE SIZE OF THE CORN EAR (KENYON SILTY CLAY LOAM).

Treatment	Stalks per hill (40" x 40") 2	3	4	5
	Average ear size (ounces)			
None	8.6	5.7	4.8	3.9
8–16–16, 100#/A	9.1	7.4	6.1	4.7
8–16–16, 200#/A	9.1	7.9	6.6	5.5

The optimum sized ear for yield on this field was one that weighed 6.6 ounces (Table III). This was a considerably smaller ear than the 9-ounce one from the fertilized 2-stalk stand, but the ears were twice as numerous and consequently the yield was better by nearly 30 bushels.

Fertile Soil with Adequate Moisture

A stand and fertilizer trial was placed on a field of a type that is

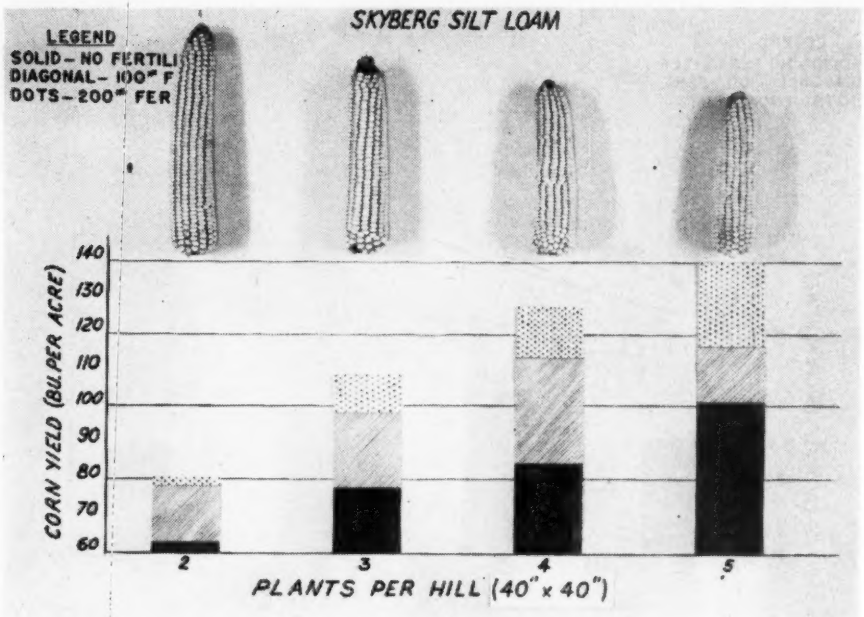


Fig. 3. Yields and relative ear sizes of corn from four rates of planting fertilized with 8-16-16 at two rates in the hill.

usually imperfectly drained (Skyberg silt loam). The year of these trials, however, the drainage proved no handicap but rather an aid, in that moisture supply was no limiting factor on the yields obtained. This soil had been well farmed and contained 200 pounds of available phosphorus (adsorbed and acid soluble) in the surface six inches, and just over 200 pounds of exchangeable potassium to the same depth. Figure 4 shows the tremendous yields that were obtained when stand and fertilization were at a fairly high level. An additional factor that contributed to these high yields was the use of a late-maturing, high-yielding hybrid, which, incidentally, was too late in maturing, for the region in which it was grown. The moisture content of the ears averaged over 50% at time of harvest, when the average should have been 25% or less in order to make cribbable corn. With this variety, 100 pounds of fertilizer proved profitable regardless of the stand. This fertilizer rate was not adequate on the 5-stalk stand, however. The second 100-pound application of fertilizer paid for itself at an increasing rate with an increase in plant population. There are no indications that 19,600 plants were the optimum planting on this field. It would appear that some stand greater than this would have proven the best.

Better than half-pound ears were obtained on the average from the 5-stalk stand even though the yield averaged 140 bushels of corn to the acre (Table IV).

It is obvious again that it is number of ears and not size alone that determines the yield.

TABLE IV.—THE EFFECT OF STALKS PER HILL AND FERTILIZER ON THE AVERAGE SIZE OF THE CORN EAR (SKYBERG SILT LOAM).

Treatment	Stalks per hill (40" x 40") 2	3	4	5
	Average ear size (ounces)			
None	9.0	7.5	6.3	6.4
8-16-16, 100#/A	11.2	9.4	8.1	6.9
8-16-16, 200#/A	11.6	10.4	9.2	8.1

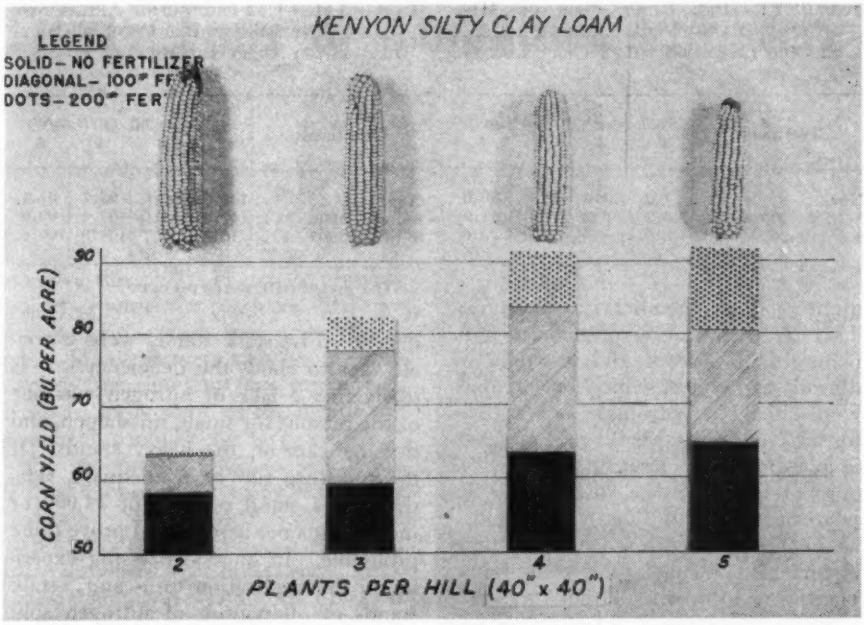


Fig. 4. Yields and relative ear sizes of corn from four rates of planting fertilized with 8-16-16 at two rates in the hill.

Shelling Percentage

It was thought worthwhile to determine the shelling percentage of the ears from a number of stands to see if one ear size had the advantage over any other. Corn from the plots on the Hubbard sandy loam field was run through a sheller and the shelling percentage determined. The results are given in Table V.

It is apparent that increasing the plant population *without* fertilization will result in corn of a lower shelling percentage. More importantly the figures show that with adequate fertilization there is no loss in shelling percentage with higher plantings. Just as much corn per bushel was shelled from corn from a fertilized 5-stalk hill as from a 2-stalk hill, even though the latter were larger, better-shaped ears.

Other Considerations

Heavier plantings had effects not only on ear size and yield, but also on number of good and poor or misshapen ears. A count of good and poor ears on each of the experimental fields was made and it was found the percentage of poor ears increased with stand.

As an example of the kind of results obtained, Table VI showing the percentage of good and poor ears on the Kenyon silty clay loam is presented.

The number of poor ears was considerably greater without fertilizer than when fertilized; 200 pounds of fertilizer gave better ears than were obtained from 100 pounds. The data show also that poor ears are more

TABLE V.—THE SHELLING PERCENTAGES OF CORN FROM VARIOUS STANDS AND RATES OF FERTILIZATION.

Treatment	Stalks per hill (40" x 40") 2	3	4	5
	Shelling percentage			
None	81.1	82.5	80.0	77.3
8–16–16, 100#/A	82.5	81.8	82.6	81.7
8–16–16, 200#/A	82.3	82.2	79.5	82.2

TABLE VI.—PER CENT POOR OR MISSHAPEN EARS FROM VARIOUS CORN STANDS (KENYON SILTY CLAY LOAM).

Treatment	Stalks per hill (40" x 40") 2	3	4	5
None	1.2	15.6	31.9	39.0
8–16–16, 100#/A	0.1	6.2	17.3	41.0
8–16–16, 200#/A	0.0	4.5	13.0	22.6

TABLE VII.—EAR-PRODUCING ABILITY OF THE CORNSTALK IN PER CENT.* (SKYBERG SILTY CLAY LOAM).

Treatment	Stalks per hill (40" x 40") 2	3	4	5
None	107.0	100.0	95.7	91.1
8–16–16, 100#/A	117.4	111.0	101.2	99.0
8–16–16, 200#/A	116.5	115.7	101.9	100.6

* One ear per stalk = 100 per cent.

numerous in the heavier plantings. This is an indication of deficiency in plant-growth factors, and it would be difficult to say just which one or ones were chiefly responsible. It was true for all experimental fields that increases in planting rate increased the number of poor ears. Rather surprisingly the poorer ears from heavier stands yielded as much shelled corn when fertilized as larger, better-shaped ears from lighter plantings. On the Hubbard sandy loam soil, the 5-stalk stand had up to 40% of poor, misshapen ears, yet the shelling percentage was as good as larger, well-shaped ears from a 2-stalk stand (Table V).

Ear and stalk counts were made in order to find out if all stalks carried at least one ear regardless of planting rate. It was found that at heavier plantings the ear count averaged less than one ear per stalk. Table VII contains the data from the Skyberg silty clay loam field, which is fairly typical of the other soils except the drouthier ones, in which the ear count was down to 75% of normal sometimes on the 5-stalk hills.

Plantings of two and three stalks per hill averaged better than one ear per stalk when fertilized. Without fertilization, heavier plantings such as the 5-stalk-per-hill rate did not average one ear per stalk, but with fertilization the 1-ear-per-stalk average was maintained.

Heavier Stands and Nitrogen

It was observed that sometimes the heavier stands showed nitrogen-deficiency symptoms to a greater or less degree. Five-stalk stands were especially apt to show the deficiency. It is likely that a lack of nitrogen was one of the reasons for small, misshapen, and missing ears on the heavy stands. If the moisture supply is adequate, sidedressing a stand of corn of 14,000 or more plants per acre should prove quite profitable. In one sidedressing experiment, the application to 4- and 5-stalk stands of 30 pounds of nitrogen split into two applications when the corn was kneehigh and hiphigh increased yields by 10 and 11 bushels, respectively.

Planting Rate an Individual Problem

There is no doubt that many farmers could plant and fertilize corn more heavily to very great advantage to themselves. Just what the optimum planting and fertilizer rate should be is nearly an individual problem. Stand should be fitted to the capacity of the soil to hold water for one thing. Fertilizer rate will vary with the fertility of the soil and with the stand. The use of ear size as a criterion of what the fertilizer rate should be is a doubtful one in Minnesota. In some areas the earlier-maturing (and consequently lower-producing) varieties must be planted to avoid the frost hazard. Ear size will vary with stand, fertility, and moisture available as the data have shown. It would seem that the thing to strive for is well-shaped ears, if necessary small ones, but plenty of them. That's what it takes to put corn in the crib.

Thirty Tons of Tomatoes Per Acre

By M. T. Vittum

Division of Vegetable Crops, N. Y. State Agricultural Experiment Station, Geneva, New York

FIFTEEN-YEAR-OLD Donald Britt of Elba, New York, can be justly proud of the 1950 4-H tomato-growing project in which he produced 30.0 tons of tomatoes on each acre of a 5.8-acre field. Many growers two, three, four, or even five times his age might well afford to study some of the techniques he used to produce this large crop.

For his project, Donald selected a field of Honeoye silt loam which is a moderately well-drained soil formed from highly alkaline, unassorted glacial drift composed of limestones, sandstones, shales, and crystallines. In 1949 this field produced 37 bushels of wheat per acre. Sweet clover had been seeded in the wheat and all wheat straw, after combining, was left on the ground.

Fertilizing

In early May of 1950, Donald disked the straw and sweet clover, and broadcast 1,500 pounds per acre of 5-10-10 fertilizer plus 500 pounds per acre of 18% superphosphate. Thus, before plowing he applied a total of 75 pounds of nitrogen (N), 240 pounds of phosphate (P_2O_5), and 150 pounds of potash (K_2O) on each acre. The fertilizer and organic matter were plowed under on May 6.

After plowing, the field was disked and "planked" or "floated" twice, and Red Jacket tomatoes were transplanted May 27. Red Jacket is a new potato-leaved variety recently developed by Professor W. T. Tapley of the Geneva Experiment Station. This variety has become so popular with New York canners and growers that it is estimated that in 1951, only three years after it was released, 50% of the cannery tomato acreage in the State will be planted to this variety.

Donald Britt (right) receives a plaque from D. F. Tobin, President of the Association of New York State Canners, in recognition of the 30-ton-per-acre yield he obtained in a 4-H tomato-growing project in 1950.

At transplanting, Donald applied to each plant approximately one-half cup of a starter solution which was made by dissolving three pounds of completely soluble 15-30-14 fertilizer in 50 gallons of water. Use of starter solutions with transplanted crops reduces loss of plants, stimulates earlier maturity, and increases total yields provided adequate reserves of plant nutrients are available to carry the crop through to maturity.

Spacing

Donald spaced his plants 28 inches apart in rows 68 inches wide, which gave 13.2 square feet per plant or 3,290 plants per acre. This spacing is somewhat closer than that used by most New York growers who usually aver-

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LIME REMOVALS by— Erosion, Leaching, Crops, Fertilizers, Sprays, and Dust[1]

By C. L. W. Swanson

Department of Soils, Connecticut Agricultural Experiment Station, New Haven, Connecticut

THE amount of lime lost from the soil annually has been the subject of study and speculation for many years. Lysimeter studies, runoff investigations, and chemical analyses of plants, soils, and fertilizers have been made on an extensive scale. We may ascribe this loss to two major factors—the removal by natural causes (erosion and leaching) and the removal in the complicated process of growing and harvesting crops (crops, fertilizers, sprays, and dusts).

Intensity and amount of rainfall, seasonal temperature, chemical and physical nature of the soil, kind of crop grown, and tillage operations are all factors which influence lime removals. Lipman estimated in 1927 that cultivated crops removed 13 pounds of lime per acre from the soils of the United States. In 1930, he estimated losses from harvesting crops, grazing, erosion, and leaching amounted to 170,464,325 tons of $CaCO_3$. Additions by fertilizer and liming materials, manure and bedding, rainfall, irrigation waters, and seeds were 31,404,183 tons. This left a net annual loss of 139,060,142 tons.

Principal mineral sources of calcium in soil are calcite, dolomite, oligoclase, labradorite, anorthite, augite, hornblende, and gypsum. Some calcium is held in organic combinations and in an exchangeable form in the colloidal complex. In surface soils calcium varies from less than 0.1 to more than 5 per cent. In some soils lime is most abundant in the lower horizons. Soils in regions of low rainfall contain larger supplies than soils in humid regions. Organic acids produced by the decomposition of forest litter leach soils of bases although in some cases the leaves are high in calcium, and lime in the surface soil is built up. Grass vegetation and roots on decomposing add lime to the surface layer of the soil.

The several processes of lime removal may be considered as follows:

1. Erosion

In removal of the soil by erosion, the finer soil particles, including humus, are sorted out and carried away. These losses are likely to be greater than one might expect since the finer material is much higher in fertility than the whole soil. The annual loss by erosion of calcium from row crops in the Tennessee river system was reported in 1945 to be 151 pounds per acre of $CaCO_3$. The erosion experiments at Columbia, Missouri, showed that 552 lbs. of $CaCO_3$ per acre were lost when corn was grown continuously, and 300 lbs. per acre for corn, wheat, clover rotation.

2. Leaching

General. It has been estimated that from 100 to 500 lbs. of lime per acre

[1] Presented at the Twelfth Annual Meeting of Agronomists with the Eastern States Farmers' Exchange, West Springfield, Mass., March 9-10, 1950.

are leached out of the soils of the North Central States each year. Leaching losses are directly related to weather conditions and time of fertilizer application. In lysimeter experiments in Connecticut using a Merrimac sandy loam soil, more than 90 per cent of the calcium loss occurred during the May-November period (fertilizers applied May 26). The rainfall was 55 per cent greater during this period and the daily temperatures were higher.

More calcium was removed in Connecticut from a Merrimac sandy loam soil by tobacco during dry summers than during wetter periods. Of basic fertilizers used, calcium was usually higher in the crop in the wetter seasons but was less for strongly acid sulfate of ammonia and ammophos treatments.

Most of the calcium in plants remains in the leaves and stalks in contrast to movement of N, P, Mg, and S to the seed. Calcium in plants is rather soluble, e.g., 34 per cent in wheat and 40 per cent in oats. Much of the calcium is leached out by rains. Of the cations, Ca is removed in largest amounts by leaching under cropped conditions (Mg from ⅓ to ½ as much, K usually less than 10-15 lbs/A).

Soils vary in Ca losses. Dunkirk silty clay loam lost 575 pounds of $CaCO_3$ per acre annually; Tama silt loam 117.5; Merrimac sandy loam 180-610; Volusia silt loam 877.5; and Ontario loam 740 pounds $CaCO_3$.

River water (drainage). The Tennessee River carries annually calcium in solution equal to 348 pounds of lime per acre of watershed. Clarke reports that the percentage of calcium in the Mississippi River varies from 17 to 23 per cent. Magnesium is next in abundance but is about one-fifth that of calcium. It has been estimated that 2,201,299 tons of $CaCO_3$ were removed in the drainage system of New England in 1942. Ross and Beeson estimate that in the United States each year 213,519 tons of $CaCO_3$ are lost by drainage into sewers.

3. Crops

Effect of leguminous green manures. Using legumes to supply nitrogen results in the production of nitrates. Nitrate nitrogen not used by plants leaches calcium out of the soil with it as $CaNO_3$. The lime needed to neutralize the acidity of a soil in Rhode Island was 2,861 lbs/A without green manure, 3,027 after rye, and 4,405 pounds after clover. The green manures were planted each year when the corn was laid by (15 years). On a Norfolk coarse sandy loam soil where leguminous green manures were used, 3.74 pounds of lime were leached from the soil for every pound of nitrogen.

Losses from bare and cropped soil. Crops markedly reduce the removal of calcium in drainage. Removal of bases through cropping also tends to leave the soil more acid. For the Dunkirk silty clay loam soil, losses of $CaCO_3$ per acre annually were 995 pounds $CaCO_3$ for bare soil, 575 for rotation, and 650 for grass; for the Volusia silt loam losses were 809 pounds of $CaCO_3$ for bare soil, and 627 pounds for rotation.

Removal through cropping. Bear gives data on the amount of $CaCO_3$ removed by harvested crops on an acre basis as follows: 100 bu. corn—1.78 pounds; 100 bu. oats — 8.90 pounds; 50 bu. wheat—3.56 pounds; 3 tons clover hay—171 pounds; 3 tons timothy hay—25 pounds; 400 bu. apples—1.78 pounds; and for 400 bu. potatoes—3.56 pounds.

The amount of calcium removed by crops is dependent on the fertilizer and cultural treatment used and the crop yield. Annual removal of lime by tobacco and grass from a Merrimac sandy loam soil in Connecticut is shown in Table I.

According to Brown of Connecticut, in mixed pasture grasses and legumes the more the clover, the greater the Ca content because clover contains more lime than grasses. In 1929 he found that with mixed grasses fertilized with phosphate and lime, or phosphate, lime,

TABLE I

Crop	Treatment [1]	Annual average dry weight lbs/A	Ca % dry weight	Annual average lbs/A (dry wt. $CaCO_3$ removed)
Tobacco	No N, no cover crop	1,787	0.86	38.4
"	No cover crop	4,545	1.43	162.5
"	Oats cover crop	4,710	1.54	181.3
"	No cover crop [2]	4,179	0.99	103.4
"	Oats cover crop [2]	4,197	1.04	109.1
"	Rye cover crop [2]	4,352	1.05	114.3
"	Timothy cover crop [2]	4,285	1.01	108.2
"	No cover crop [3]	4,184	1.30	136.0
Grass [4]	No nitrogen	1,113	0.49	13.6
"		3,935	0.45	44.3

[1] 100 lbs. P_2O_5, 200 lbs. K_2O, 50 lbs. MgO, 200 lbs. N/A (Calurea—80% urea, 20% $CaNO_3$).
[2] 120 lbs. N as cottonseed meal, 40 lbs. as castor pomace, 40 lbs. as nitrate of soda.
[3] Same except 167 lbs. N (117 lbs. of N sidedressed).
[4] Timothy, fescue, bluegrass.

and potash, nearly 50 per cent more Ca was obtained in the dry matter for these treatments than for untreated, phosphate, or nitrogen, phosphate, and potash treated plots. Nitrogenous fertilizers depressed the uptake of Ca. Omission of superphosphate to sweet vernal, Kentucky bluegrass, and white clover resulted in very low contents of Ca. Probably some of the Ca was obtained from the Ca in the superphosphate. Eighty-six samples of grass collected from pastures throughout Vermont averaged 0.825 per cent calcium.

Unpublished data of Mehring state that 85,003 tons of $CaCO_3$ are removed in harvested crops alone in New England.

Removal by trees. Chandler found that the calcium content of the foliage of five forest tree species increased progressively throughout the growing season. Mature foliage of trees like red cedar, basswood, and black locust averaged more than 2 per cent calcium; shagbark hickory, American elm, red oak, and white pine averaged from 1 to 2 per cent; and red maple, hemlock, and Scotch pine averaged less than 1 per cent calcium. Mixed leaves in Massachusetts have been found to contain 2.29 per cent $CaCO_3$. Work in Illinois shows that trees growing on poor soils have lower contents of Ca than those in good soils. On an average, about 165 lbs/A of $CaCO_3$ are returned annually to the soil by hardwood forest trees and 67.5 pounds by conifers.

4. Fertilizer Applications

Work based on the lysimeters of the Connecticut Station show that in the absence of growing plants, soils having a good supply of lime lose approximately 3.57 per cent of lime for each pound of N applied. The Ca is leached out as calcium nitrate. Work in England showed that when crops are grown, the N not taken up by the crop but which is leached out of the soil carries 3.57 pounds of lime with it. This compares with 3.74 lbs. given for a Norfolk coarse sandy loam where leguminous green manures were used.

The effect of nitrogenous fertilizers in removing Ca from the soil by leaching is shown in Connecticut lysimeter experiments using a Merrimac sandy loam soil. Where the soil was fallowed and P and K were applied, 208 lbs/A of $CaCO_3$ were recovered in the leachate. Addition of N (200 lbs/A of Calurea) to the fertilizer increased the $CaCO_3$ to 542 lbs/A. Adding N to soils planted to tobacco increased the $CaCO_3$ in the leachate

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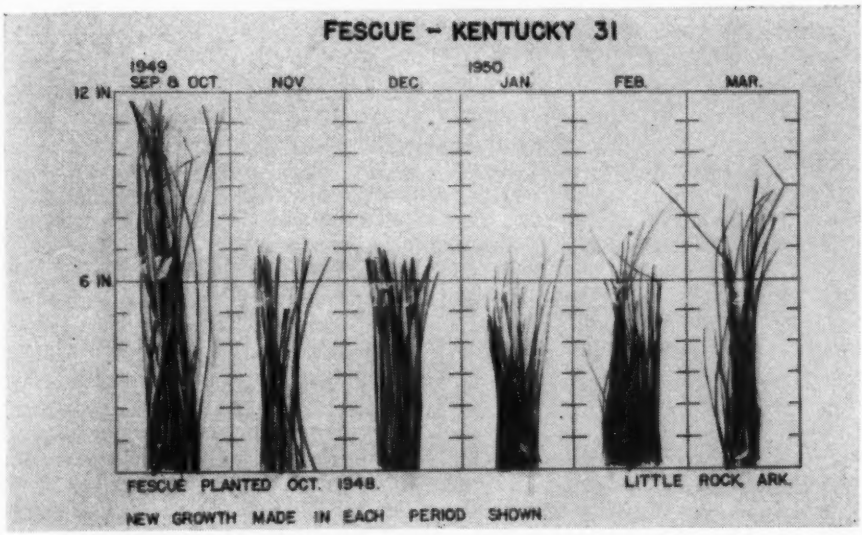

Fig. 1. New growth made from September 1, 1949, through March 1950 by months. Base leaves predominate September through December.

Field Observations on Tall Fescue

By Edgar A. Hodson

Agronomist, Soil Conservation Service, Little Rock, Arkansas

SELDOM has a new crop had the attention that has been given to tall fescue the past few years. Farmers are making extensive plantings of this grass and are asking numerous questions about establishing and managing it.

Field observations give convincing proof that fescue has a very definite place in the permanent pasture phase of the soil conservation work in Arkansas. But because of the claims that have been made for it, some growers have expected too much. It is, however, better than any other perennial cool season grass that has been widely grown here.

Soil Conservation district cooperators in Arkansas planted 84 acres in 1946, 688 acres in 1948, and 3,610 acres in 1949. This represents plantings made by 503 farmers, and as evidence of its popularity the acreage is being increased this year by 22,000.

When and how much to graze fescue has been a question without a complete answer. An observation plot was clipped in September 1949 and then clipped on the first of each month from November on through 1950.

A chemical analysis of these clippings of both the new growth and the total growth made up to the date of sampling was made at Soil Conservation

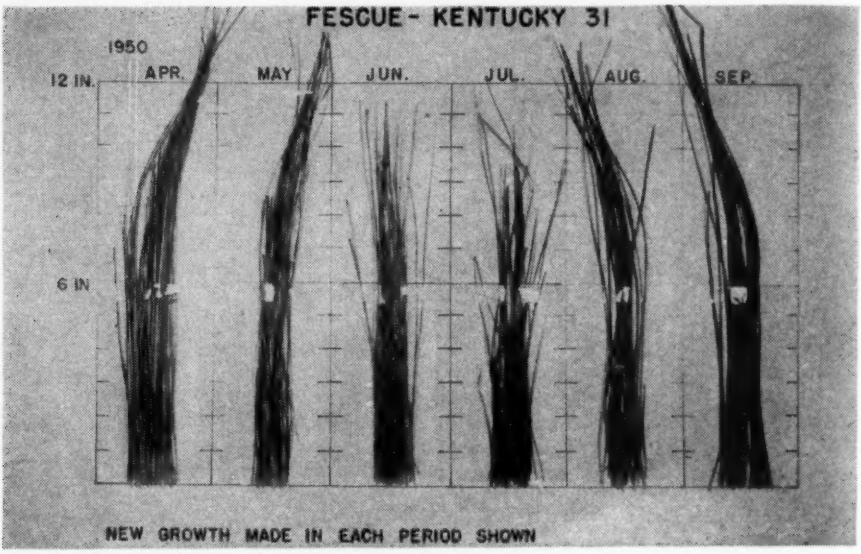

Fig. 2. New growth made from April 1, 1950, through September 1950. Seed stalks predominate through April and May. Base leaves make up all of the June, July, and August growth. Stem leaves are present in the September growth. Because of the good growing season in 1950, the stem leaves began to emerge much earlier than in 1949.

Service Operations Laboratory, Fort Worth. Similar samples were taken from oats and ryegrass for comparison. The results of the analysis are interesting and should help to answer the question on grazing.

The vegetative growth of fescue the first year after planting closely resembles that of ryegrass, and remains highly palatable for the entire growing season until seed matures in the early summer. The mild 1949-50 winter followed by unusually favorable rainfall distribution in the summer of 1950, which in turn was followed by very severe winter weather, afforded an unusual opportunity to observe the development and use of fescue pasture under extreme growing conditions.

The normal growth cycle from seed crop to seed crop requires 12 months. A new crop of crown buds develops in the early spring, and from it a crop of base leaves develops. The normal summer and fall growth is made up entirely of base leaves. About the time the base leaves have made their full growth, stem leaves begin to emerge and continue to grow until the seed crop develops. The base leaves are considerably coarser and a little less palatable than the stem leaves. It appears that a limited amount of summer grazing should be obtained if there is sufficient moisture to allow continuous new growth. Continuous new growth was available for grazing all through the 1949-50 winter season.

From mid-November 1950, the temperature was too low to allow much, if any, new growth. Winter grazing can be insured by either allowing very light fall grazing or by delaying use until early winter. Tables I and II, show the relative protein and crude fiber content from clipped and unclipped samples for the winter months of 1949-50. Where the fall growth was reserved for winter grazing the protein content varied from 12 to 20 per cent compared with 17 to 30 per cent for the clipped plot.

Bill Lewis, a cooperator with the Sebastian County Soil Conservation District, Greenwood, Arkansas, planted 10 acres of fescue in the fall of 1949.

This pasture was held in reserve for winter grazing last winter and in spite of the severe cold gave good grazing from the first of December.

Tables I and II show the protein and crude fiber content for fescue, ryegrass, and oats at various stages of development and for the total growth to the date of sampling. The palatability of fescue in the summer and fall is determined by the stage of development of the basal leaves at the time of use. The analyses indicate that the grazing period having the highest palatability and feed value is from the time the stem leaves begin to emerge until late spring when seed stems begin to develop.

White clover or ladino clover grown along with fescue will be available in the fall months and again in the late spring when the quality of the fescue falls off. The combination will yield a high quality of forage. Heavy summer grazing will greatly retard and reduce the fall and winter growth and should be limited to a moderate use to keep any excess growth out of the way. To provide the necessary forage for winter use, the pasture plan should include oats or other supplementary pasture for late fall or early winter grazing or enough fescue to defer the grazing on a sufficient acreage to be held in reserve until needed during the mid-winter months.

Plantings have been made on a wide variety of soil types but, as would be expected, the best growth was obtained on the most fertile, well-drained soils. Fescue has done well on soils very low in fertility where liberal applications of complete fertilizer were made. It thrives equally well on the wetter soils. Growth is retarded during periods when the water table is at or near the surface, but it withstands being submerged for considerable periods with relatively little injury. With deep sandy soils and light sandy loams as possible exceptions, fescue can be grown successfully on almost any soil type if the necessary fertilizer is added. Fescue fits perfectly into a cropping system for year-round grazing because of its season of usefulness, and because it is adapted to the wetter soils it can be used there

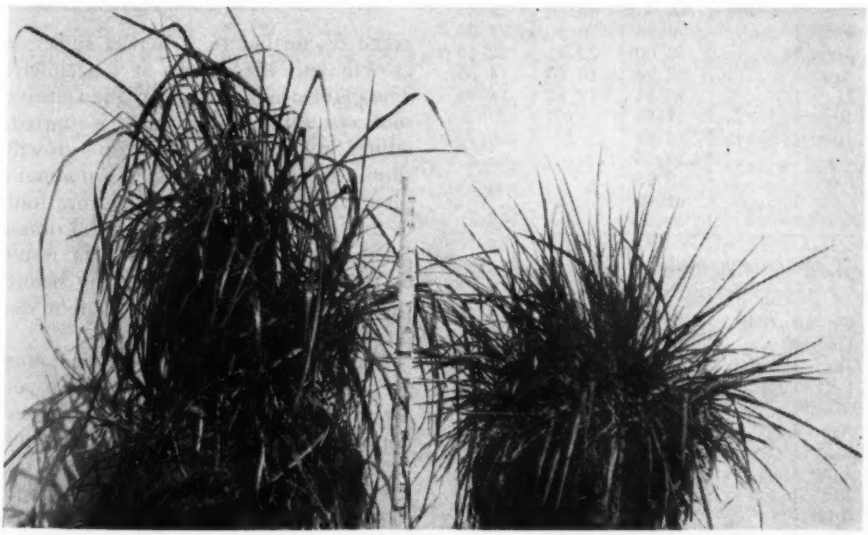

Fig. 3. The plant on the right is from a plot that was clipped on the first day of each month from January 1, 1950, to November 1, 1950; that on the left from a plot that was clipped June 1, 1950, and then again November 1, 1950. The picture was made April 1, 1951, and shows the total winter growth from November 1, 1950, to April 1, 1951. It emphasizes the importance of letting fescue "rest" during the summer months in order to get maximum cool season growth.

to better advantage than any other pasture crop.

Early fall planting has been far more satisfactory than any other. When fescue is planted on land where competition from weeds and other grasses may be a factor the first year, it may be better to use from two to five pounds more seed to the acre than would be necessary on clean-cultivated land.

Fescue-legume pastures will require careful management to maintain a good stand of both types of forage. How best to accomplish this must be learned from additional experience. Many growers who have been accustomed to grazing Bermuda grass are tempted to graze fescue before it makes sufficient growth and then graze it too closely. The plant needs to develop an extensive root system before grazing is started, which means that the top growth should be half kneehigh. To maintain plant vigor, a top growth of from four to five inches should be left at all times. Some of the near failures are the result of too close grazing or grazing before the plants have reached full root development.

Soil conservation district cooperators are finding that increased yields of forage more than pay for the fertilizer applied to fescue. Heavy applications of nitrogen fertilizers are necessary for maximum production; however, a good part of the needed nitrogen can be supplied by growing white or ladino clover with the grass.

Soil conservation district cooperators

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TABLE I.—CRUDE PROTEIN.

Date Sampled	Fescue (Little Rock, Ark.)	Ryegrass (Jonesboro, Ark.)	Oats (Jonesboro, Ark.)
(New growth made during the preceding month)			
Nov. 1, 1949..	17.38[1]	21.00	21.63
Dec. 1.....	19.19[1]	22.31	23.13
Jan. 1, 1950..	26.63	30.56	28.38
Feb. 1.....	30.94[2]	29.25	27.50
Mar. 1.....	30.00[2]	22.31	22.44
Apr. 1.....	22.94	16.63	14.50
May 1.....	15.44	13.81	14.94
June 1.....	17.88	4.63	.....
July 1.....	16.63	.....	.....
Aug. 1.....	19.25	.....	.....
Sep. 1.....	18.75	.....	.....
Oct. 1.....	21.69	.....	.....
(Total growth made to date of sampling)			
Nov. 1, 1949..	12.62	.....	.....
Dec. 1.....	14.44	18.68	20.31
Jan. 1, 1950..	20.31	24.36	23.44
Feb. 1.....	20.31	25.81	26.19
Mar. 1.....	19.94	18.38	18.00
Apr. 1.....	24.25	25.13	11.19
May 1.....	15.94	11.38	19.44
June 1.....	.....	5.69	.....
July 1.....	.....	.....	.....
Aug. 1.....	.....	.....	.....
Sep. 1.....	15.69	.....	.....
Oct. 1.....	13.63	.....	.....

[1] Base leaves.
[2] Young stem leaves.

TABLE II.—CRUDE FIBER.

Date Sampled	Fescue	Ryegrass	Oats
(New growth made during the preceding month)			
Dec. 1, 1949..	21.8	13.3	12.7
Jan. 1, 1950..	19.4	17.8	14.8
Feb. 1.....	19.2	15.5	19.0
Mar. 1.....	18.3	15.3	14.5
Apr. 1.....	20.3	15.8	14.8
May 1.....	32.8	25.5	27.6
June 1.....	28.5	33.5	.....
July 1.....	25.15	.....	.....
Aug. 1.....	25.87	.....	.....
Sep. 1.....	26.5	.....	.....
Oct. 1.....	25.5	.....	.....
(Total growth made to date of sampling)			
Dec. 1, 1949..	25.3	14.16	13.2
Jan. 1, 1950..	26.5	17.8	16.4
Feb. 1.....	24.7	19.1	15.9
Mar. 1.....	25.4	19.0	16.1
Apr. 1.....	24.2	19.7	14.8
May 1.....	32.3	28.5	28.5
June 1.....	.....	34.6	.....
July 1.....	.....	.....	.....
Aug. 1.....	.....	.....	.....
Sep. 1.....	28.9	.....	.....
Oct. 1.....	30.5	.....	.....

Can Soil Organic Matter Be Accumulated?

By Joel Giddens, F. H. Perkins, and W. O. Collins

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IN the past, agricultural workers in Georgia and other Southern States have preached the use of green manure crops to "build up the organic matter of the soils." The value of these crops in a rotation is unquestionable. There is little evidence, however, to indicate that organic matter is increased except only temporarily in soils of this area by these crops when kept in continuous cultivation. In connection with a soil organic matter survey in Georgia, it was observed that content of organic matter in the soil was not closely related to cropping practices. The purpose of this paper is to (a) relate certain physical factors of some of the leading soil series to organic matter content and (b) to examine the effect of several so-called "land-building" practices on soil organic matter.

Methods

For the organic matter survey, only soil samples submitted by soil surveyors and others experienced in soil classification were used. Composite samples taken from cultivated fields to a depth of 5-6 inches were included. The cropping practices varied from continuous row crops to the better rotation systems.

To study the effect of different soil-building practices on organic matter, soil samples were taken from 13 so-called "land-building" plots on a Cecil soil varying in texture from a sandy loam to a sandy clay loam at Whitehall, Georgia, in 1940 and 1948. From each plot a composite sample of 12 to 15 borings made to a depth of 5 to 6 inches was taken. The fertilizer and cropping practices used are outlined in Table II.

Organic matter determinations were made by the modified Walkley-Black method (3). Results were calculated to 100 per cent oxidation, assuming 66 per cent oxidation by the method.

Results and Discussion

Organic Matter by Soil Types

Soils on which organic matter determinations were made represent some of the leading series of the geographic soil areas of Georgia.

Results reported in Table I indicate that organic matter content of the well-drained cultivated soils is higher for the heavier-textured soils. There is some organic matter variation in different soil series of close association of the same textural type, but in general it is related to soil texture. Cecil sandy loam with $1.278 \pm .028$ per cent organic matter is in general a heavier soil than Appling sandy loam with $1.062 \pm .043$ per cent. Tifton sandy loam of the Coastal Plain with $1.312 \pm .031$ per cent organic matter is a heavier soil than Norfolk sandy loam with $1.051 \pm .019$ per cent organic matter. In fact, many of the Norfolk soils classified as sandy loam are actually loamy sands as shown by mechanical analysis.

The less well-drained soils, as would be expected, contain a higher organic matter content. Drainage affects the rate of oxidation in a soil. Some of these soil series, especially lowland soils, vary considerably in degree of drainage and also in organic content.

TABLE I.—ORGANIC MATTER CONTENT OF CULTIVATED GEORGIA SOILS BY SERIES, TOPOGRAPHY, AND AREAS.

Soil	No. Samples	Mean Per Cent
Appalachian Mountain Area		
Upland		
Fannin loam	73	*2.069±.076
Hayesville clay loam or loam	57	1.907±.087
Lowland		
State silt loam	39	2.717±.145
Transylvania silt loam	46	2.922±.123
Limestone Valley Area		
Upland		
Clarkesville silt loam	37	1.930±.080
Dewey silt loam	26	1.600±.094
Fullerton silt loam	15	1.660±.221
Piedmont Plateau Area		
Upland		
Cecil sandy loam	273	1.278±.028
Appling sandy loam	95	1.062±.043
Lloyd sandy loam	98	1.222±.039
Madison sandy loam	124	1.338±.037
Lowland		
Congaree sandy loam	45	1.904±.112
Upper Coastal Plain Area		
Upland		
Greenville fine sandy loam	21	1.330±.076
Orangeburg sandy loam	16	0.950±.050
Magnolia fine sandy loam	16	0.780±.046
Middle Coastal Plain		
Upland		
Norfolk sandy loam	227	1.051±.019
Tifton sandy loam	116	1.312±.031
Lowland		
Plummer sandy loam	41	2.076±.106
Lower Coastal Plain		
Upland		
Scranton fine sandy loam	230	1.480±.030
Less well-drained		
Lynchburg loamy sand	20	1.580±.080
Portsmouth loamy sand	20	5.410±.415

* Standard Error.

Jenny (2) has shown that soil organic matter is greatly influenced by temperature, the amount being approximately doubled for a decrease in mean annual temperature of 10 degrees C. It is recognized that lower mean annual temperature accounts for part of the higher organic matter in the Appalachian Mountain and Limestone Valley soils of North Georgia. Apparently, part of the higher organic content of these soils can be attributed to the heavier soil texture.

Soil Organic Matter on Different Land Uses

Organic matter content of the "land-building" plots is reported in Table II for the years 1940 and 1948. Except for the plot with manure applied, there was a tendency for the cultivated soils to approach a constant organic level, low ones to increase and higher ones to decrease. This seems to be irrespective of treatment. The area being badly eroded in spots accounts for the variable organic matter of the 1940 samples.

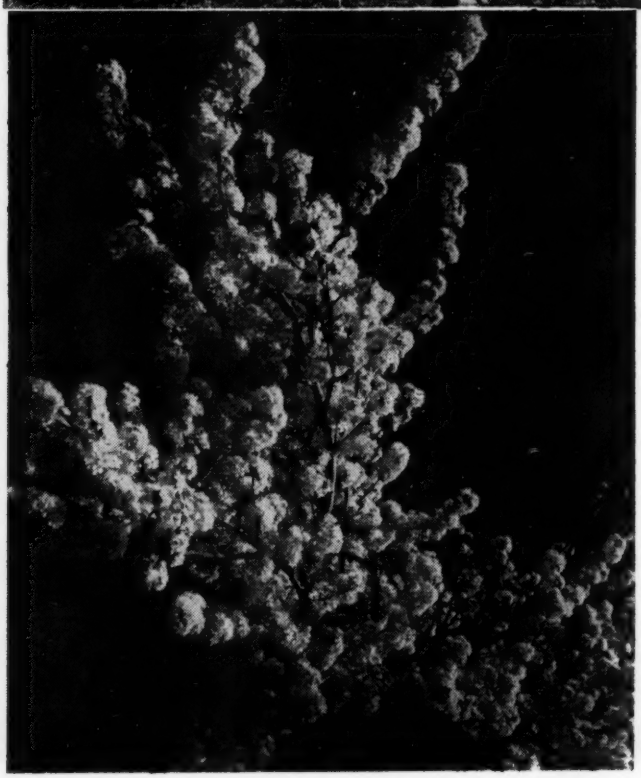
From a study of organic matter as influenced by different cropping systems on Land Classes II, III, and IV of the Southern Piedmont, Gosdin, Stelly, and Adams (1) reported that after a six-year period there was a tendency towards approximately the same level of organic matter in all the soils studied.

The mild, humid climate of Georgia results in rapid decomposition of organic residues in soils. It does not appear practical to attempt to raise the organic matter above a certain level in well-drained soils in the State and still keep them in cultivation. For well-drained soils, texture appears to be a predominant factor affecting organic matter, and for lowland soils it is drainage. Erosion, of course, is an important factor in the level of organic matter reached and should not be overlooked in any cropping system. Ero-

(*Turn to page* 42)

PICTORIAL

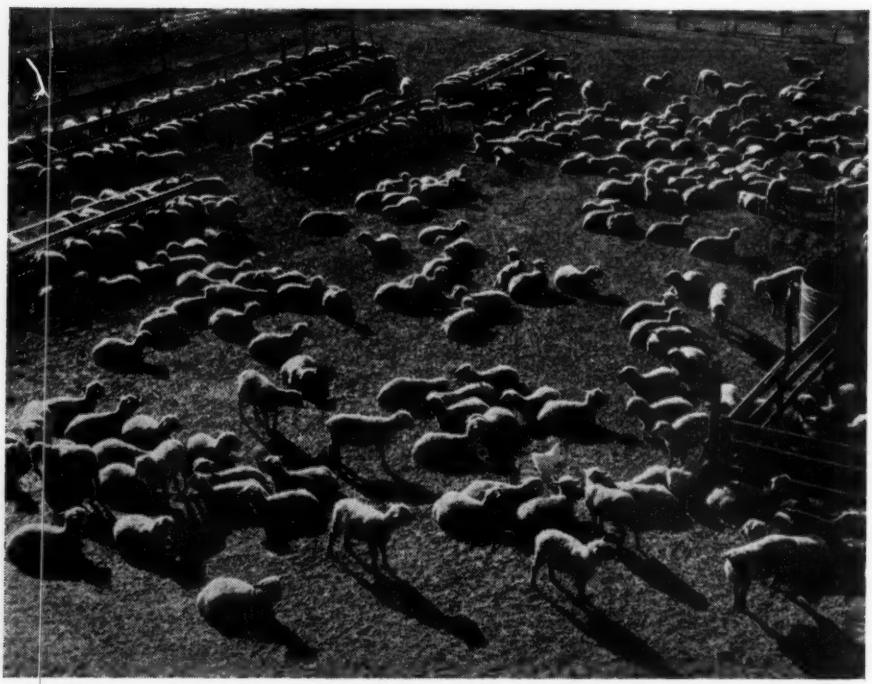
According to Directions!



Spring Blossoms

Spring Odors

Keeping up the meat supplies is currently one of our Nation's chief agricultural concerns.



The Editors Talk

Soil Management

Everyone uses the term "soil management," yet how many know just what it involves. Dr. F. W. Parker, soils authority of the U. S. Department of Agriculture, defines it as follows: Soil management is the efficient production of quality crops along with continued improvement in soil productivity.

Going into the considerations involved, Dr. Parker says that the fundamental requirements of a productive soil include the most favorable combination of soil moisture and air, an ample supply of needed nutrients, root room, and the absence of harmful factors.

Soil structure is the key to ideal soil moisture and air condition, he points out. Soil with good structure retains an ample supply of moisture and enough air to allow the roots to breathe. Maintenance of soil structure is becoming a big problem on many of the predominantly clay soil farms in the Great Plains, the Corn Belt, and the Black Belt of Texas, Mississippi, and Alabama. In most of these areas, structure is associated with the loss of from 25 to 50 per cent or more of the soil organic matter. Correcting this condition largely means protecting the soil from further breakdown and giving it a chance to rebuild. Dr. Parker recommends the growth of sod crops with good root systems, plus the use of green manure crops, crop residues, composts, mulches, and farm manures. Fertilizers have little direct effect on soil structure, but when used to promote the growth of the sod and green manure crops and deep-rooted legumes, fertilizers indirectly rebuild the soil. Fertilization, by increasing crop yields, often doubles or trebles the amount of organic matter returned to the soil as crop residue or farm manure.

"Fertilizers also play an important role in the number and quantity of needed soil nutrients," he says. "Since a 100-bushel corn crop takes 400 pounds of mineral nutrients from the soil in from 120 to 160 days, it is easy to see that continually repeating such a process without resupplying the soil with nutrients will soon devastate it. Even virgin soils are not necessarily stocked with nutrients. Most virgin soils lack some important mineral; many lack several of them. The parent material of the soil, the vegetation that grows on it, the rainfall, temperature, time, and topography all play a part in soil nutrient content. Fertility tends to be greater where temperatures and rainfall are moderate. Soils in the South are relatively low in soil nutrients because of warm temperatures and heavy rainfall. In the cooler North and drier West, soils are generally more fertile. However, when rainfall is too low to support good grass growth, some nutrients are again lacking. Organic soils formed from the accumulation of plant residues are just as likely to lack nutrients as more common mineral soils. Crops grown on organic soils have no source of vital minerals, and so cannot supply them to the soil. The use of commercial fertilizers furnishes the primary method of rebuilding the supply of nutrients in soil. Liming materials and nitrogen-supplying legumes are also important."

Enough room for root growth is Dr. Parker's final essential soil-management consideration. Lack of room may be caused by a high water table, hardpan, poor soil structure or the presence of salts. In turn, extending root room may require drainage, the removal of salts, and the addition of organic matter, lime, and nutrients below plow depth. The use of deep-rooted legumes is probably the best way to extend root room, although this end can often be achieved by applying lime and nutrients with attachments to chisels or other deep-tillage implements. The extensive root systems of alfalfa and kudzu make these two legume crops ideal for the job of extending the rooting zone for subsequent crops. These crops add root residues and, as a result, a larger rooting zone is gradually developed and improved.

With such a diversity of soil types and conditions in the United States, Dr. Parker emphasizes that there is no one best way to maintain soil quality . . . . to achieve good soil management. It is first necessary to understand the needs of the soil and then to use the various management methods that will cause the soil to produce good crop yields while retaining its own vitality.

Farm Labor Shortages

Every day in the approach to the heavy-work season on the farm is increasing the concern over farm labor shortages. With the draft and the lure of higher wages in factories making their inroads on young workers, many a farm operator is viewing his future with a deep feeling of helplessness. To him, the calls for increased production may seem like "so much talk," yet a word of encouragement may be found in a talk by Under Secretary of Agriculture Clarence J. McCormick at the Ninth Annual Rural Life Conference in Wilmington, Ohio, on March 30.

"The best hope of meeting the labor shortage, of producing up to the very high goals we have set, is through the increased production of folks on family farms," Mr. McCormick said. "Some family farmers may wonder what I am talking about when they already get up before the east has begun to lighten and work till it's too dark to see at night. Yet on some family farms, people are underemployed. Their land is not used to best advantage, their operations are less efficient than they should be, and they are not able to help either themselves or the Nation as well as they might. Through increasing the productivity of these less productive farms, we can help solve the labor problem, we can assure production of more of the things the Nation needs, and we can provide a much better standard of living on many of these underdeveloped farms. Perhaps the best way to say it is that we want to see that underdeveloped farms become true family farms—farms that fully use the family labor and provide a good family living. The Nation must see to it that the operators of such farms can get sound credit, the equipment they need, fertilizer, and the other things it takes to run a successful farm today."

Here, again, is another challenge to add to the already overchallenged agricultural advisory forces. That they will find the time to aid the farm operators needing such help is assured by the long and high record of the efficiency and effectiveness of these extension groups.

Season Average Prices Received by Farmers for Specified Commodities *

Crop Year	Cotton Cents per lb. Aug.-July	Tobacco Cents per lb.	Potatoes Cents per bu. July-June	Sweet Potatoes Cents per bu. July-June	Corn Cents per bu. Oct.-Sept.	Wheat Cents per bu. July-June	Hay [1] Dollars per ton July-June	Cottonseed Dollars per ton July-June	Truck Crops ....
Av. Aug. 1909–July 1914....	12.4	10.0	69.7	87.8	64.2	88.4	11.87	22.55	....
1925.....	19.6	16.8	170.5	165.1	69.9	143.7	12.77	31.59	....
1926.....	12.5	17.9	131.4	117.4	74.5	121.7	13.24	22.04	....
1927.....	20.2	20.7	101.9	109.0	85.0	119.0	10.29	34.83	....
1928.....	18.0	20.0	53.2	118.0	84.0	99.8	11.22	34.17	....
1929.....	16.8	18.3	131.6	117.1	79.9	103.6	10.90	30.92	....
1930.....	9.5	12.8	91.2	108.1	59.8	67.1	11.06	22.04	....
1931.....	5.7	8.2	46.0	72.6	32.0	39.0	8.69	8.97	....
1932.....	6.5	10.5	38.0	54.2	31.9	38.2	6.20	10.33	....
1933.....	10.2	13.0	82.4	69.4	52.2	74.4	8.09	12.88	....
1934.....	12.4	21.3	44.6	79.8	81.5	84.8	13.20	33.00	....
1935.....	11.1	18.4	59.3	70.3	65.5	83.2	7.52	30.54	....
1936.....	12.4	23.6	114.2	92.9	104.4	102.5	11.20	33.36	....
1937.....	8.4	20.4	52.9	78.0	51.8	96.2	8.74	19.51	....
1938.....	8.6	19.6	55.7	69.8	48.6	56.2	6.78	21.79	....
1939.....	9.1	15.4	69.7	73.4	56.8	69.1	7.94	21.17	....
1940.....	9.9	16.0	54.1	85.4	61.8	68.2	7.59	21.73	....
1941.....	17.0	26.4	80.8	92.2	75.1	94.4	9.70	47.65	....
1942.....	19.0	36.9	117.0	118.0	91.7	110.0	10.80	45.61	....
1943.....	19.9	40.5	131.0	206.0	112.0	136.0	14.80	52.10	....
1944.....	20.7	42.0	150.0	190.0	109.0	141.0	16.50	52.70	....
1945.....	22.5	36.6	143.0	204.0	127.0	150.0	15.10	51.10	....
1946.....	32.6	38.2	124.0	218.0	156.0	191.0	16.70	72.00	....
1947.....	31.9	38.0	162.0	217.0	216.0	229.0	17.60	85.90	....
1948.....	30.4	48.2	155.0	222.0	129.0	200.0	18.45	67.20	....
1949.....	28.6	46.3	128.0	214.0	119.0	186.0	16.55	43.40	....
1950									
April.....	28.74	....	134.0	228.0	126.0	201.0	16.65	44.40	....
May.....	29.24	48.5	128.0	228.0	134.0	204.0	17.25	45.20	....
June.....	29.91	49.7	127.0	211.0	136.0	193.0	16.05	46.20	....
July.....	33.05	45.5	127.0	208.0	144.0	199.0	15.15	52.00	....
August.....	36.95	53.1	122.0	218.0	144.0	197.0	15.45	70.90	....
September...	39.98	55.4	105.0	192.0	144.0	194.0	15.55	78.80	....
October.....	38.90	55.1	85.8	154.0	137.0	191.0	15.85	81.50	....
November....	41.13	52.5	87.8	148.0	137.0	194.0	16.45	98.40	....
December....	40.36	47.2	88.9	173.0	145.0	203.0	17.05	102.00	....
1951									
January.....	41.31	45.9	98.6	194.0	154.0	209.0	17.85	101.00	....
February....	41.75	32.5	103.0	205.0	160.0	221.0	18.45	100.00	....
March.....	42.73	26.6	107.0	207.0	160.0	212.0	18.35	103.00	....
Index Numbers (Aug. 1909—July 1914 = 100)									
1925.....	158	168	245	188	109	163	108	140	143
1926.....	101	179	189	134	116	138	112	98	139
1927.....	163	207	146	124	132	135	87	154	127
1928.....	145	200	76	134	131	113	95	152	154
1929.....	135	183	189	133	124	117	92	137	137
1930.....	77	128	131	123	93	76	93	98	129
1931.....	46	82	66	83	50	44	73	40	115
1932.....	52	105	55	62	50	43	52	46	102
1933.....	82	130	118	79	81	84	68	57	91
1934.....	100	213	64	91	127	96	111	146	95
1935.....	90	184	85	80	102	94	63	135	119
1936.....	100	236	164	106	163	116	94	148	104
1937.....	68	204	76	89	81	109	74	87	110
1938.....	69	196	80	79	76	64	57	97	88
1939.....	73	154	100	84	88	78	67	94	91
1940.....	80	160	78	97	96	77	64	96	111
1941.....	137	264	116	105	117	107	82	211	129
1942.....	153	369	168	134	143	124	91	202	163
1943.....	160	405	188	235	174	154	125	231	245
1944.....	167	420	214	216	170	160	139	234	212
1945.....	181	366	205	232	198	170	127	227	207
1946.....	263	382	178	248	212	209	141	319	182
1947.....	257	380	232	248	336	259	148	381	226
1948.....	245	482	222	253	201	226	155	298	214
1949.....	231	463	184	244	210	210	139	192	201
1950									
April.....	232	...	192	260	196	227	140	197	205
May.....	236	485	184	260	209	231	145	200	178
June.....	241	497	182	240	212	218	135	205	182
July.....	267	455	182	237	224	225	128	231	200
August.....	298	531	175	248	224	223	130	314	164
September...	322	554	151	219	224	219	131	349	126
October.....	314	551	123	175	213	216	134	361	138
November....	332	525	126	169	213	219	139	436	188
December....	325	472	128	197	226	230	144	452	211
1951									
January.....	333	459	141	221	240	236	150	448	324
February....	337	325	148	233	249	250	155	443	333
March.....	345	266	154	236	249	240	155	457	265

Wholesale Prices of Ammoniates

	Nitrate of soda bulk per unit N	Sulphate of ammonia bulk per unit N	Cottonseed meal S. E. Mills per unit N	Fish scrap, dried 11–12% ammonia, 15% bone phosphate, f.o.b. factory bulk per unit N	Tankage 11% ammonia, 15% bone phosphate, f.o.b. Chicago, bulk, per Unit N	High grade ground blood, 16–17% ammonia, Chicago, bulk, per Unit N
1910–14	$2.68	$2.85	$3.50	$3.53	$3.37	$3.52
1925	3.11	2.47	5.41	5.34	3.97	4.75
1926	3.06	2.41	4.40	4.95	4.36	4.90
1927	3.01	2.26	5.07	5.87	4.32	5.70
1928	2.67	2.30	7.06	6.63	4.92	6.00
1929	2.57	2.04	5.64	5.00	4.61	5.72
1930	2.47	1.81	4.78	4.96	3.79	4.58
1931	2.34	1.46	3.10	3.95	2.11	2.46
1932	1.87	1.04	2.18	2.18	1.21	1.36
1933	1.52	1.12	2.95	2.86	2.06	2.46
1934	1.52	1.20	4.46	3.15	2.67	3.27
1935	1.47	1.15	4.59	3.10	3.06	3.65
1936	1.53	1.23	4.17	3.42	3.58	4.25
1937	1.63	1.32	4.91	4.66	4.04	4.80
1938	1.69	1.38	3.69	3.76	3.15	3.53
1939	1.69	1.35	4.02	4.41	3.87	3.90
1940	1.69	1.36	4.64	4.36	3.33	3.39
1941	1.69	1.41	5.50	5.32	3.76	4.43
1942	1.74	1.41	6.11	5.77	5.04	6.76
1943	1.75	1.42	6.30	5.77	4.86	6.62
1944	1.75	1.42	7.68	5.77	4.86	6.71
1945	1.75	1.42	7.81	5.77	4.86	6.71
1946	1.97	1.44	11.04	7.38	6.60	9.33
1947	2.50	1.60	12.72	10.66	12.63	10.46
1948	2.86	2.03	12.94	10.59	10.84	9.85
1949	3.15	2.29	10.11	13.18	10.73	10.62
1950						
April	3.00	2.32	10.34	12.58	10.39	8.19
May	3.00	2.05	10.74	11.97	10.14	7.59
June	3.00	1.71	10.55	10.79	9.41	7.36
July	3.00	1.71	11.53	10.71	9.35	8.74
August	3.00	1.71	11.44	11.06	10.62	9.87
September	3.00	1.71	11.44	10.85	10.85	10.32
October	3.00	1.71	11.86	10.63	10.62	10.32
November	3.00	1.68	11.96	10.63	10.85	10.62
December	3.00	1.88	13.48	10.95	10.93	10.93
1951						
January	3.10	1.88	13.37	11.30	11.29	11.11
February	3.13	1.88	13.58	11.39	11.53	11.30
March	3.13	1.88	13.56	11.41	11.53	11.53
Index Numbers (1910-14 = 100)						
1925	115	87	155	151	117	135
1926	113	84	126	140	129	139
1927	112	79	145	166	128	162
1928	100	81	202	188	146	170
1929	96	72	161	142	137	162
1930	92	64	137	141	112	130
1931	88	51	89	112	63	70
1932	71	36	62	62	36	39
1933	59	39	84	81	97	71
1934	59	42	127	89	79	93
1935	57	40	131	88	91	104
1936	59	43	119	97	106	131
1937	61	46	140	132	120	122
1938	63	48	105	106	93	100
1939	63	47	115	125	115	111
1940	63	48	133	124	99	96
1941	63	49	157	151	112	126
1942	65	49	175	163	150	192
1943	65	50	180	163	144	189
1944	65	50	219	163	144	191
1945	65	50	223	163	144	191
1946	74	51	315	209	196	265
1947	93	56	363	302	374	297
1948	107	71	370	300	322	280
1949	117	80	289	373	318	302
1950						
April	112	81	295	356	308	233
May	112	72	307	339	301	216
June	112	60	301	306	279	209
July	112	60	329	303	277	248
August	112	60	327	313	315	280
September	112	60	327	307	322	293
October	112	60	339	301	315	293
November	112	59	342	301	322	302
December	112	66	385	310	324	311
1951						
January	116	66	382	320	335	316
February	117	66	388	323	342	321
March	117	66	388	323	342	328

Wholesale Prices of Phosphates and Potash * *

	Superphosphate, Baltimore, per unit	Florida land pebble, 68% f.o.b. mines, bulk, per ton	Tennessee phosphate rock, 75% f.o.b. mines, bulk, per ton	Muriate of potash bulk, per unit, c.i.f. Atlantic and Gulf ports[1]	Sulphate of potash in bags, per unit, c.i.f. Atlantic and Gulf ports[1]	Sulphate of potash magnesia, per ton, c.i.f. Atlantic and Gulf ports[1]	Manure salts bulk, per unit, c.i.f. Atlantic and Gulf ports[1]
1910–14	$0.536	$3.61	$4.88	$0.714	$0.953	$24.18	$0.657
1925	.600	2.44	6.16	.584	.860	23.72	.483
1926	.598	3.20	5.57	.596	.854	23.58	.537
1927	.525	3.09	5.50	.646	.924	25.55	.586
1928	.580	3.12	5.50	.669	.957	26.46	.607
1929	.609	3.18	5.50	.672	.962	26.59	.610
1930	.542	3.18	5.50	.681	.973	26.92	.618
1931	.485	3.18	5.50	.681	.973	26.92	.618
1932	.458	3.18	5.50	.681	.963	26.90	.618
1933	.434	3.11	5.50	.662	.864	25.10	.601
1934	.487	3.14	5.67	.486	.751	22.49	.483
1935	.492	3.30	5.69	.415	.684	21.44	.444
1936	.476	1.85	5.50	.464	.708	22.94	.505
1937	.510	1.85	5.50	.508	.757	24.70	.556
1938	.492	1.85	5.50	.523	.774	15.17	.572
1939	.478	1.90	5.50	.521	.751	24.52	.570
1940	.516	1.90	5.50	.517	.730	24.75	.573
1941	.547	1.94	5.64	.522	.780	25.55	.367
1942	.600	2.13	6.29	.522	.810	25.74	.205
1943	.631	2.00	5.93	.522	.786	25.35	.195
1944	.645	2.10	6.10	.522	.777	25.35	.195
1945	.650	2.20	6.23	.522	.777	25.35	.195
1946	.671	2.41	6.50	.508	.769	24.70	.190
1947	.746	3.05	6.60	.432	.706	18.93	.195
1948	.764	4.27	6.60	.397	.681	14.14	.195
1949	.770	3.88	6.22	.397	.703	14.14	.195
1950							
April	.760	3.76	5.47	.375	.720	14.50	.200
May	.760	3.76	5.47	.375	.720	14.50	.200
June	.760	3.76	5.47	.336	.647	12.77	.176
July	.760	3.76	5.47	.368	.704	13.98	.193
August	.760	3.76	5.47	.368	.704	13.98	.193
September	.760	3.75	5.47	.368	.704	13.98	.193
October	.760	3.73	5.47	.386	.704	13.98	.193
November	.760	3.73	5.47	.386	.732	14.72	.193
December	.798	3.73	5.47	.420	.796	16.00	.210
1951							
January	.810	3.73	5.47	.420	.796	16.00	.210
February	.810	3.73	5.47	.420	.796	16.00	.210
March	.810	3.73	5.47	.420	.796	16.00	.210
Index Numbers (1910-14 = 100)							
1925	110	68	126	82	90	98	74
1926	112	88	114	83	90	98	82
1927	100	86	113	90	97	106	89
1928	108	86	113	94	100	109	92
1929	114	88	113	94	101	110	93
1930	101	88	113	95	102	111	94
1931	90	88	113	95	102	111	94
1932	85	88	113	95	101	111	94
1933	81	86	113	93	91	104	91
1934	91	87	110	68	79	93	74
1935	92	91	117	58	72	89	68
1936	89	51	113	65	74	95	77
1937	95	51	113	71	79	102	85
1938	92	51	113	73	81	104	87
1939	89	53	113	73	79	101	87
1940	96	53	113	72	77	102	87
1941	102	54	110	73	82	106	87
1942	112	59	129	73	85	106	84
1943	117	55	121	73	82	105	83
1944	120	58	125	73	82	105	83
1945	121	61	128	73	82	105	83
1946	125	67	133	71	81	102	82
1947	139	84	135	70	74	78	83
1948	143	118	135	67	72	58	83
1949	144	108	128	67	74	58	83
1950							
April	142	104	112	68	76	60	83
May	142	104	112	68	76	60	83
June	142	104	112	63	68	53	80
July	142	104	112	67	74	58	82
August	142	104	112	67	74	58	82
September	142	104	112	67	74	58	82
October	142	103	112	70	74	58	82
November	142	103	112	70	77	61	82
December	149	103	112	75	84	66	85
1951							
January	151	103	112	75	84	66	85
February	151	103	112	75	84	66	85
March	151	103	112	75	84	66	85

Combined Index Numbers of Prices of Fertilizer Materials, Farm Products and All Commodities

	Farm prices*	Prices paid by farmers for commodities bought*	Wholesale prices of all commodities†	Fertilizer material‡	Chemical ammoniates	Organic ammoniates	Superphosphate	Potash**
1925	156	153	151	112	100	131	109	80
1926	146	150	146	119	94	135	112	86
1927	141	148	139	116	89	150	100	94
1928	149	152	141	121	87	177	108	97
1929	148	150	139	114	79	146	114	97
1930	125	140	126	105	72	131	101	99
1931	87	119	107	83	62	83	90	99
1932	65	102	95	71	46	48	85	99
1933	70	104	96	70	45	71	81	95
1934	90	118	109	72	47	90	91	72
1935	109	123	117	70	45	97	92	63
1936	114	123	118	73	47	107	89	69
1937	122	130	126	81	50	129	95	75
1938	97	122	115	78	52	101	92	77
1939	95	121	112	79	51	119	89	77
1940	100	122	115	80	52	114	96	77
1941	123	130	127	86	56	130	102	77
1942	158	149	144	93	57	161	112	77
1943	192	165	151	94	57	160	117	77
1944	196	174	152	96	57	174	120	76
1945	206	180	154	97	57	175	121	76
1946	234	197	177	107	62	240	125	75
1947	275	231	222	130	74	362	139	72
1948	285	250	241	134	89	314	143	70
1949	249	240	226	137	99	319	144	70
1950								
April	241	240	223	135	96	313	142	72
May	247	244	228	132	91	311	142	72
June	247	245	230	126	85	293	142	66
July	263	247	238	128	85	301	142	70
August	267	248	243	131	85	321	142	70
September	272	252	247	131	85	324	142	70
October	268	253	247	131	85	323	142	73
November	276	255	251	132	85	328	142	74
December	286	257	256	138	88	346	149	78
1951								
January	300	262	261	140	90	351	151	78
February	313	267	268	141	91	358	151	78
March	311	271	268	141	91	357	151	78

* U. S. D. A. figures, revised January 1950. Beginning January 1946 farm prices and index numbers of specific farm products revised from a calendar year to a crop-year basis. Truck crops index adjusted to the 1924 level of the all-commodity index.

† Department of Labor index converted to 1910-14 base.

‡ The Index numbers of prices of fertilizer materials are based on original study made by the Department of Agricultural Economics and Farm Management, Cornell University, Ithaca, New York. These indexes are complete since 1897. The series was revised and reweighted as of March 1940 and November 1942.

[1] Beginning July 1949, baled hay prices reduced by $4.75 a ton to be comparable to loose hay prices previously quoted.

[2] All potash salts now quoted F.O.B. mines only: manure salts since June 1941, other carriers since June 1947.

**** The weighted average of prices actually paid for potash is lower than the annual average because since 1926 over 90% of the potash used in agriculture has been contracted for during the discount period. Since 1937, the maximum discount has been 12%. Applied to muriate of potash, a price slightly above $.471 per unit K_2O thus more nearly approximates the annual average than do prices based on arithmetical averages of monthly quotations.**

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

"Fertilizers for Alaska 1950," Agr. Exp. Sta., Univ. of Alaska, Palmer, Alaska, Cir. 10, Feb. 1950.

"Sales of Commercial Fertilizers and of Agricultural Minerals Reported to Date for Quarter Ended December 31, 1950," Dept. of Agr., Sacramento, Calif., Bur. of Chem. Announcement No. FM-207, Feb. 20, 1951.

"Fertilizer Guide—Maritime Provinces of Canada 1951," Maritime Fert. Council, Moncton, N. B., Can., J. E. McIntyre.

"Commercial Fertilizers 1949 and 1950," Dept. of Agr., Atlanta, Ga., Serials Nos. 134 and 135, Jan. 1951.

"Tonnage of Commercial Fertilizer Reported by Manufacturers as Shipped to Kansas in the Fall of 1950, By Counties," State Brd. of Agr., Control Div., Topeka, Kans., July 1, 1950 to Dec. 31, 1950.

"Maryland Fertilizer Facts for 1950," Insp. and Reg. Serv., College Park, Md.

"General Fertilizer Recommendations for Central Nebraska," CC 106, 1951, M. D. Weldon and W. E. Ringler; "General Fertilizer Recommendations for Western Nebraska," CC 107, 1950; "General Fertilizer Recommendations on Irrigated Land in Nebraska," CC 108, 1951, M. D. Weldon and W. R. Ringler; Ext. Serv., Univ. of Neb., Lincoln, Neb.

"Facts and Findings about Fertilizers in North Dakota," Dept. of Agron., N. D. Agr. College, Fargo, N. D., Dec. 6, 1950.

"Summary of Fertilizer and Fertilizer Materials Sold in South Carolina, July 1 through December 31, 1950," Clemson Agr. College, Clemson, S. C., Mar. 1, 1951.

Soils

"Irrigating the Prairie Home Garden," Pub. 851, Dec. 1950, H. C. Korven; "Organic Soil Management for Vegetables," Pub. 853, Dec. 1950, F. S. Browne; Dept. of Agr., Ottawa, Ont., Can.

"Protecting Your Soil," Ext. Serv., Univ. of Ill., Urbana, Ill., Cir. 667, Sept. 1950, C. A. Van Doren and L. E. Gard.

"Christian County Soils," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., Soil Rpt. 73, Aug. 1950, J. B. Fehrenbacher, R. S. Smith, and R. T. Odell.

"Phosphate Facts," Ext. Serv., Univ. of Minn., St. Paul, Minn., Soil Series No. 34, Misc. Paper No. 741.

"Effects of Diverting Sediment-Laden Runoff From Arroyos to Range and Crop Lands," USDA, Wash., D. C., Tech. Bul. No. 1012, Aug. 1950, D. S. Hubbell and J. L. Gardner.

Crops

"Arkansas Farmers Stand Ready," Ext. Serv., Univ. of Ark., Fayetteville, Ark., Cir. No. 470, 1950 A. R.

"Arkot 2-1—The New Arkansas Cotton," Agr. Exp. Sta., Univ. of Ark., Fayetteville, Ark., Rpt. Series 19, Aug. 1950.

"Report of the Minister of Agriculture for Canada for the Year Ended March 31, 1950," Ottawa, Ont., Can.

"Experimental Substation for Mucklands, Ste. Clothilde, Quebec," P. R. 1936-1948, Ste. Clothilde, Que., Can.

"Apple Growing in Eastern Canada," Pub. 847; "Plum Culture," Pub. 849; Dept. of Agr., Ottawa, Ont., Can., Dec. 1950, D. S. Blair.

"The Value of Pasture for Milk Production," Agr. Exp. Sta., Univ. of Del., Newark, Del., Bul. No. 286, June 1950, C. E. Phillips and T. A. Baker.

"First-Year Yields from Louisiana White Clover-Dallis Grass Pasture Plots on Carnegie and Tifton Fine Sandy Loams," Agr. Exp. Sta., Univ. of Fla., Gainesville, Fla., Cir. S-19, Sept. 1950, N. Gammon, Jr., H. W. Lundy, J. R. Neller, and R. A. Carrigan.

"Home Garden for the Coastal Plain of Georgia," Mimeo. Paper No. 12, Rev. Dec. 1950; "Truck Crops for the Coastal Plain of Georgia," Mimeo. Paper No. 72, Jan. 1951; "Planting and Care of Muscadine Grapes," Mimeo. Paper No. 75, Mar. 1951, O. Woodard and W. T. Brightwell; Ga. Coastal Plain Exp. Sta., Tifton, Ga.

"Progress Report on the Utilization of Perennial Grazing Ladino Clover and Tall Fescue," Ga. Mt. Exp. Sta., Blairsville, Ga., Mimeo. Series No. 26, Aug. 1950, O. L. Brooks and W. H. McKinney.

"Agricultural Research in Idaho, Fifty-Seventh Annual Report, Year Ending June 30,

1950," Agr. Exp. Sta., Univ. of Idaho, Moscow, Idaho, Bul. No. 280, July, 1950.

"Progress of Agricultural Research in Indiana," Agr. Exp. Sta., Purdue Univ., Lafayette, Ind., Sixty-Third A. R., June 30, 1950.

"Farm Ponds for Iowa," Agr. Exp. Sta., Iowa State College, Ames, Iowa, Bul. P109, July 1950, D. O. Hull, R. A. Wilcox, and E. B. Speaker.

"Kansas Corn," Cir. 219, L. E. Willoughby and E. A. Cleavinger; "Sorghums in Kansas," Cir. 220, L. E. Willoughby and F. G. Bieberly; Ext. Serv., Kans. State College, Manhattan, Kans., May 1950.

"Pecan Production in Louisiana," La. State Univ., Baton Rouge, La., Ext. Pub. 1057, Reprinted July 1950, J. A. Cox, R. S. Woodward, and A. O. Alben.

"Ten Suggestions for Growing Tomatoes in the Home Garden," Ext. Serv., Univ. of Md., College Park, Md., Misc. Pub. 117, May 1950, E. K. Bender.

"Dahlias in the Garden," Ext. Fldr. F-144, Mar. 1950; "Garden Roses," Ext. Fldr. F-145, Apr. 1950; "Gladiolus Culture," Ext. Fldr. F-146, Apr. 1950; "Feeding Potatoes to Livestock," Ext. Fldr. F-147, Apr. 1950; "African Violets," Ext. Fldr. F-148; "The Home Fruit Garden," Ext. Fldr. F-149, May 1950; "Peony Culture," Ext. Fldr. F-150, May 1950; "Hay and Pasture Crops for Emergency Use," Ext. Fldr. F-151, May 1950; "Grass Silage," Ext. Fldr. F-153, June 1950; Ext. Serv., Mich. State College, East Lansing, Mich.

"Improved Varieties of Farm Crops," Ext. Fldr. 22, Rev. Feb. 1951; "Tips on Tree Planting," Ext. Fldr. 85, Rev. Mar. 1951, P. Anderson; "Vegetable Varieties for Minnesota," Ext. Fldr. 154, Feb. 1951, O. C. Turnquist; Ext. Serv., Univ. of Minn., St. Paul, Minn.

"Red Rustproof Oats Lead in Winter Grazing Small Grain Variety Tests at South Mississippi Experiment Station," Inf. Sheet 452, Aug. 1950, H. A. Johnson and J. B. Gill; "Oat Varieties Compared for Grain Yields," Inf. Sheet 453, Sept. 1950, S. S. Ivanoff, D. Bowman, B. L. Arnold, B. C. Hurt, Jr., S. L. Wedgeworth, C. L. Blount, and H. A. Johnson; Agr. Exp. Sta., Miss. State College, State College, Miss.

"Success with Strawberries," Bul. 542, Nov. 1950, A. D. Hibbard and D. D. Hamphill; "1950 Yield Trials with Corn Hybrids in Missouri," Bul. 544, Dec. 1950, M. S. Zuber, C. O. Grogan, and W. E. Aslin; Agr. Exp. Sta., Univ. of Mo., Columbia, Mo.

"Better Pastures, An Important Part of Balanced Farming," Ext. Serv., Univ. of Mo., Columbia, Mo.

"Breeding Improved Horticultural Plants, II. Fruits, Nuts, and Ornamentals," Agr. Exp. Sta., Univ. of N. H., Durham, N. H., Sta. Bul. 383, June 1950, A. F. Yeager.

"Pasture Management Investigations," Agr. Exp. Sta., Univ. of N. H., Durham, N. H., Sta. Cir. 81, June 1950, F. S. Prince and P. T. Blood.

"The New Jersey Green Pasture Program, Reporting for 1950," Ext. Serv., Rutgers Univ., New Brunswick, N. J., Ext. Bul. 257, Jan. 1951, J. E. Baylor.

"Bromegrass Strain Performance Trials," Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Bul. 753, Dec. 1950, G. H. Ahlgren and L. Dotzenko.

"Field Crop Recommendations 1951," Ext. Serv., Rutgers Univ., New Brunswick, N. J., Leaf. 47, Dec. 1950, J. E. Baylor.

"Cornell Recommends for Field Crops," Cornell Univ., Ithaca, N. Y., 1951.

"Good Pasture Is a Bargain!" Ext. Serv., Cornell Univ., Ithaca, N. Y., Hay and Pasture Ltr. No. 3.

"North Dakota's Agricultural Progress Through Research," Agr. Exp. Sta., N. D. Agr. College, Fargo, N. D., Annual Report, Sta. Bul. 365, Jan. 1951.

"Cotton Production Insect and Disease Control South Carolina 1951," Ext. Serv., Clemson College, Clemson, S. C., Cir. 358, Jan. 1951.

"Progress Report, 1950 Oklahoma Vegetable Research Station at Bixby, Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Mimeo. Cir. M-202, June 28, 1950.

.."Agricultural Research in Texas, 1947-49," Agr. Exp. Sta., College Station, Texas.

"Mustang Oats," Agr. Exp. Sta., College Station, Tex., Bul. 728, Oct. 1950, I. M. Atkins.

"Building a Better Utah," Ext. Serv., Utah State Agr. College, Logan, Utah, 1948-50 Biennial Report.

"Agricultural Research," Agr. Exp. Sta., Va. Poly. Institute, Blacksburg, Va., Rpt. for Yr. Ending June 30, 1950.

"Safflower, Agronomic, Processing, and Economic Data," Agr. Exp. Sta., State College of Wash., Pullman, Wash., Bul. 521 and No. 210, Jan. 1951, S. Kellenbarger, R. L. Albrook, and A. H. Harrington.

"Science Serves Your Farm," Agr. Exp. Sta., W. Va. Univ., Morgantown, W. Va., Bul. 342, Sept. 1950.

"Cody—A New Oat for Wyoming," Bul. 301, Sept. 1950, D. W. Bohmont; "Dryland Pastures for the Great Plains, Bul. 302, Oct. 1950, O. K. Barnes and A. L. Nelson; Agr. Exp. Sta., Univ. of Wyo., Laramie, Wyo.

"Improving Native Hay Meadows in Wyoming," Agr. Exp. Sta., Univ. of Wyo., Laramie, Wyo., Cir. 38, Oct. 1950, T. J. Dunnewald.

"Report of the Chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration 1950," USDA, Wash., D. C.

"1950 Report of the Chief of the Forest Service, Cooperation in Forestry," USDA, Wash., D. C.

"Our Forests: What They Are and What They Mean to Us," Misc. Pub. No. 162, Rev. Oct. 1950, USDA, Wash., D. C.

Economics

"The Agricultural Outlook for Canada 1951," Dept. of Agr., Ottawa, Ont., Can.

"A Retirement Guide for Connecticut Farmers," Ext. Serv., Univ. of Conn., Storrs, Conn., Fldr. 43, Aug. 1950, P. L. Putnam and W. C. McKain, Jr.

"Pimiento Peppers," Mimeo. Series 12, Jan. 1950, B. J. Harrington; "Cotton Production Practices and Cost in the Lower Coastal Plain of Georgia," Mimeo. Series 27, Sept. 1950, W. T. Fullilove and J. C. Elrod; "Spanish Peanut Production Practices and Costs, in the Coastal Plain of Georgia," Mimeo. Series 28, Sept. 1950, W. T. Fullilove and J. C. Elrod; "Oat Production Practices and Costs, in the Piedmont of Georgia," Mimeo. Series 29, Oct. 1950; "Okra Production Practices and Costs in the Lower Coastal Plain of Georgia," Mimeo. Series 30, Oct. 1950, B. J. Harrington; Agr. Exp. Sta., Univ. of Ga., Experiment, Ga.

"Agricultural Statistics for Louisiana 1909-1949," Agr. Exp. Sta., La. State Univ., Baton Rouge, La., La. Bul. No. 444, June 1950, J. P. Montgomery and S. L. Bryan.

"Maine Snap Beans, Sweet Corn, and Green Peas for Processing," Agr. Exp. Sta., Univ. of Me., Orono, Me., Mimeo. Rpt. No. 11, Mar. 1950, W. E. Schrumpf.

"Farm Business Inventory and Net Worth Statement," Ext. Fldr. F-154, Dec. 1950, J. C. Doneth and B. R. Bookhout; "Social Security for Farm Workers," Ext. Fldr. F-155, Jan. 1951, E. B. Hill; Ext. Serv., Mich. State College, East Lansing, Mich.

Field Observations on Tall Fescue . . .

(*From page* 24)

have applied various amounts of fertilizers and fertilizer mixtures. In general they are all in agreement that the best plan is to determine the lime, phosphorus, and potash needed to get the companion clover established. Numerous soil analyses show that the average site that will be used for the fescue-clover combination will require about one ton of lime, 400 pounds of 20-per-cent phosphate, and from 80 to 120 pounds of muriate of potash. In addition and to supply the nitrogen needed by the fescue, 100 pounds of ammonium nitrate should be applied in the fall and the same amount again in the early spring.

Ben Block Meyer, a cooperator in Cross County Soil Conservation District at Wynne, Arkansas, planted 10

Fig. 4. Fescue planted September 2, 1949, on the Arkansas State College Farm, Jonesboro, Ark. Growth shows benefit from fertilizer. Four hundred pounds of 5-10-5 were applied at time of planting. This picture shows where one round made by the fertilizer distributor was partly clogged up.

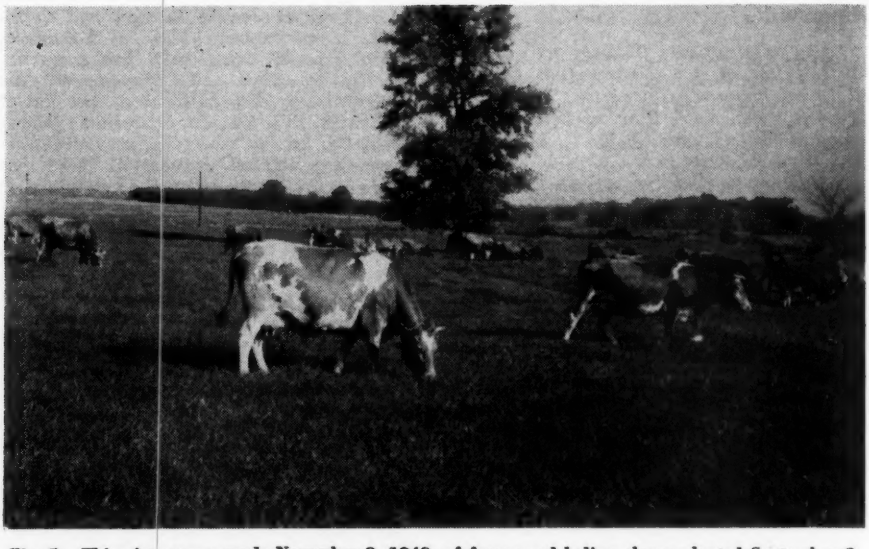


Fig. 5. This picture was made November 9, 1949, of fescue and ladino clover planted September 2, 1949, Arkansas State College Farm, Jonesboro, Ark. The 24-acre block carried an average of 35 head of dairy cows and 20 sheep from March 1, 1950, until November 10. The dairy cows had two hours per day supplementary grazing on sweet sudan during the summer months, and the unusually good growing season made continuous grazing available, which could not be expected with average rainfall. Four hundred pounds of 5-10-5 were applied at time of planting and the soil was typical Crowley's Ridge soil, having a low fertility level.

acres of fescue and ladino clover on loessial terrace soil of only medium fertility in the fall of 1949. He applied two tons of lime, 300 pounds of 20-percent phosphate, and 500 pounds of 5-10-5 per acre at the time of planting, and a topdressing of 150 pounds of ammonium nitrate in March 1950. Included in the same pasture are 13 acres of common lespedeza, with a light sod of Dallis grass and some redtop, which supplied a moderate amount of summer grazing only. This pasture furnished grazing as follows:

October and November 1949	120 days
February and March 1950	4,140 days
No grazing in April and May to allow a seed crop to mature.	
June 1 to 15, 1950	450 days
July 1 to 15, 1950	665 days
August 1 to 10, 1950	450 days
September 1 to October 15, 1950	3,105 days
Total for 7 months	8,930 days

Rainfall at Little Rock, Arkansas

By Months from September 1949 to October 1950

Sept. 1949	2.75 inches
Oct.	9.68 "
Nov.	0.28 "
Dec.	4.78 "
Jan. 1950	12.53 "
Feb.	9.27 "
Mar.	4.90 "
Apr.	2.75 "
May	8.37 "
June	2.07 "
July	1.87 "
Aug.	7.59 "
Sept.	6.77 "
Oct.	1.29 "

Number of Days When the Temperature Fell to Freezing and Below During the Winter Months 1949-50

Dec. 1949	9 days
Jan. 1950	11 days
Feb. 1950	10 days
Mar. 1950	5 days

Green From the Grass Roots

MANY kinds of grass start growth in spring before the soil has warmed up enough for the roots to become active in collecting and supplying the plant with nutrients from the soil. In these early weeks of growth, the plant draws on reserve materials stored in the roots. This results in relatively slow early growth, but the plant does progress in developing green leaves and top growth ready to go to work as soon as the roots become active. The leaves are the factory part of the plant. As soon as the roots send up raw plant nutrients, the leaves in sunlight are ready to convert this into plant material. Growth is then rapid, and pastures and ranges supply the lush forage associated with spring. If the first leaves that develop from root reserves are grazed off, it is like destroying part of the machinery in a factory. The factory cannot do its full job of production.

This is the elementary explanation which E. William Anderson of the Soil Conservation Service of the U. S. Department of Agriculture offers, in discouraging grazing of the first growth of the range grasses. Grazing too early will limit the supply later in the season.

Grazing too close late in the season is also undesirable. The grass plants need an opportunity to restore the food reserves in the roots that will be carried over winter and will get the plants off to a good start the following spring.

Grass in Shade

WHAT bothers lawn makers most is to get a good green turf in the shade. According to Dr. Fred V. Grau, who carries on research for the U. S. Golf Association, in cooperation with the U. S. Department of Agriculture, the public asks more questions about this shade problem than about any other matter related to grass growing on home grounds. "This sounds reasonable," he says, "when we consider that nearly everyone likes shade trees and a good lawn, and that in 99.44 per cent of the cases you can't have both. The shade is above the grass and the roots of the trees are underneath, leaving the grass in a pinch—and the loser."

But Grau gives out some helpful suggestions to people in the various regions: In the South, St. Augustine grass will grow to the bases of shade trees if the trees are high and open. In the North, the fescues (Chewing's fescue and sheep's fescue) do pretty well under shade trees when soil is well drained. Boughstalk bluegrass (Poa trivialis) is good if it gets plenty of water. But under the Norway maples it is practically impossible to have a good turf because shade is so very dense and the feeder roots are so shallow.

A common mistake in attempting to grass shady places is to sow in the spring so that the seed sprouts about the time the trees become strong competitors for moisture and light.

Fall is the best time for two reasons—the special reason that trees are about to drop their leaves, and the second and general reason (for lawns in shade or sun) that weeds and trees are not such vigorous competitors then.

Thirty Tons of Tomatoes Per Acre

(*From page* 17)

age 15 or 16 square feet per plant, or about 2,800 plants per acre.

The field was cultivated five times between June 1 and July 10, and the tomatoes were sprayed according to the alternating schedule of Zerlate and copper recommended by Professor W. T. Schroeder, Canning Crops Plant Pathologist at the Geneva Experiment Station (Table I).

TABLE I.—SPRAY SCHEDULE USED TO CONTROL EARLY BLIGHT, LATE BLIGHT, AND ANTHRACNOSE.

Date of application	Material
July 20	Zerlate
Aug. 5	Zerlate
Aug. 18	Copper
Sept. 3	Zerlate
Sept. 15	Copper

In addition to the sprays, a 7% metallic copper dust was applied by plane on August 30.

The field was picked four times, and the total yield for the season was 30.0 tons per acre (Table II). Most of the tomatoes were delivered to the Haxton Foods, Inc., canning factory at LeRoy where they graded 72.7% No. 1's, 25.1% No. 2's and 2.2% culls.

Gross returns for the crop totaled

TABLE II.—YIELD SUMMARY.

Date of harvest	Tons per acre
Sept. 1– 6	4.2
Sept. 12–15	10.1
Sept. 25–27	11.6
Oct. 8	4.1
Total	30.0

$4,560, while total costs for everything except Donald's own time totaled $2,349. Thus, the net profit for the project was $2,211, or $381 per acre. Donald, a freshman at South Byron High School, has deposited the money in the bank to help pay expenses when he enrolls in the College of Agriculture at Cornell University in September 1954.

Good tomato-growing practices which are demonstrated by Donald's success include the following: (1) Plow under plenty of organic matter, preferably including a deep-rooted legume such as sweet clover or alfalfa; (2) Use large amounts of fertilizer; (3) Use varieties which are adapted to the area; (4) Use starter solutions at transplanting; (5) Control weeds by adequate cultivation; (6) Control diseases and insects.

Can Soil Organic Matter . . .

(*From page* 26)

sion is likely the main cause for the same or lower organic content of upland Piedmont soils as compared with the lighter-textured, well-drained Coastal Plain soils.

Summary and Conclusions

Organic matter determinations were made on a large number of cultivated Georgia soils and on soils with different land-use practices. The results in-

TABLE II.—ORGANIC MATTER CONTENT OF SOILS OF "LAND-BUILDING" PROJECT—WHITEHALL, GEORGIA.*

Plot No.	Treatment	% Organic Matter	
		1940	1948
1	Pines	1.17	1.11
2	Black locust 800 lbs. 5–7–5 fertilizer at start	1.25	1.36
3	Cowpeas in summer. Crimson clover turned in spring. 100 lbs. KCl	1.00	1.13
4	Cowpeas in summer. Crimson clover turned in spring. No fertilizer	0.87	1.41
5	White sweet clover. 4,000 lbs. limestone, 600 lbs. superphosphate, 100 lbs. KCl each 2 years	1.06	1.50
6	Cowpeas in summer. Crimson clover turned in spring. No fertilizer	1.21	1.31
7	Cowpeas in summer. Crimson clover turned in spring. 500 lbs. basic slag annually. 100 lbs. KCl	0.78	1.31
8	Pines—Included in No. 1	.....	.....
9	Vetch and lespedeza sericea. 600 lbs. basic slag and 100 lbs. muriate each 5 years	1.13	1.34
10	Cowpeas in summer. Crimson clover turned in spring. 2,000 lbs. limestone. 100 lbs. KCl	1.70	1.21
11	Cowpeas in summer. Crimson clover turned in spring. 600 lbs. superphosphate, 2,000 lbs. limestone, 100 lbs. KCl.	1.70	1.45
12	Cowpeas in summer. Crimson clover turned in spring. 200 lbs. 4–7–4, 100 lbs. KCl, 4 tons stable manure annually	1.70	2.04
13	Cowpeas in summer. Crimson clover turned in spring. 300 lbs. superphosphate, 100 lbs. KCl	1.13	1.16
14	Cowpeas in summer. Rye turned in spring with 200 lbs. Ca cyanamide. 600 lbs. basic slag, 100 lbs. KCl to each crop	0.87	0.97

* Started 1938 on Cecil soil of sandy loam to sandy clay texture. Corn planted each 5 years and fertilized uniformly except for plots 1, 2, and 8. KCl added to plots only after first 5 years. Plots with cowpeas in summer and crimson clover in winter have fertilizer applied to each crop at rates listed.

dicate that for a given area the organic matter content of cultivated Georgia soils is more closely related to factors such as soil texture and drainage that affect decomposition rates than to the ordinary cropping practices. Apparently the organic content of some Southern soils that are below the level governed by environmental factors can be increased slightly, for example, severely eroded soils. For most soils it is not practical to raise the organic level. More emphasis should be placed on use of green manure and cover crops for immediate supply of nitrogen and to reduce leaching and erosion losses rather than to build up organic matter. During active decomposition, organic matter continuously releases plant nutrients and possibly exerts other benefits. The objective should be to maintain a continuous supply of actively decomposing organic materials in the soil at all times.

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Lime Removals . . .

(*From page* 20)

134 pounds and in the tobacco 125 pounds; for grass the respective increases were 31 and 30 pounds. Least $CaCO_3$ was leached from the grass plots with PK fertilizer only and the largest amount from the fallow soil with NPK fertilizer. Soils cropped to tobacco were intermediate. Associated with losses of $CaCO_3$ were corresponding increases in acidity.

Ammonium sulfate, urea, and cottonseed meal, with and without neutralization, were added to a strongly acid and a nearly neutral Merrimac sandy loam soil under uncropped conditions. Neutralizing the soil produced greater amounts of Ca in the leachate for all conditions, but to a lesser extent in the nearly neutral than in the acid soil. On neutralizing the fertilizers applied to the acid soil, losses of Ca and increases in acidity (pH) corresponded to the net acidity of the fertilizer; greatest for ammonium sulfate, next for urea, and least for cottonseed meal.

Each pound of nitrogen in ammonium sulfate would require about 7¼ pounds of agricultural limestone to neutralize the acidity produced. Urea requires about 3.6 pounds and cottonseed meal 3.2 pounds of lime per pound of nitrogen. Basic fertilizers like cyanamid and tobacco stems add about 1.2 and 2.5 pounds of lime, respectively, to soils.

Further evidence of the efficiency of ammonium sulfate in leaching Ca from the soil is shown by the results from an experiment using sodium nitrate, ammonium sulfate, urea, and cottonseed meal as nitrogenous carriers. Enfield very fine sandy loam, Merrimac loamy sand, Wethersfield loam, and Merrimac sandy loam were the soils used in the Connecticut lysimeters. For every soil the largest $CaCO_3$ losses were obtained from the ammonium sulfate fertilizers. Next in lime removal was urea, cottonseed meal, and sodium nitrate. Omitting N from the fertilizer produced an intermediate loss of lime. In all cases the least lime was lost from the soil of lightest texture (Merrimac loamy sand, 120 lbs/A) and the largest from the heaviest texture (Wethersfield loam, 746 lbs/A). The soil with the greatest exchangeable Ca (Wethersfield) lost the most lime, followed in order of exchangeable Ca (Merrimac sandy loam, Enfield very fine sandy loam, and Merrimac loamy sand least).

In a Connecticut lysimeter experiment using Merrimac sandy loam soil the interaction of various fertilizer cations (Ca, Mg, K, Na) and anions (CO_3, SO_4, Cl, PO_4) in relation to the nitrification of urea, to soil reaction, and to leaching of the various constituents from an uncropped soil were compared. In every case exchangeable Ca was less at the end of the experiment than in the beginning. Calcium was removed from the soil in the largest amounts by the chloride treatments ($CaCl_2$, $CaSO_4$, etc.), followed in order by the sulfate, carbonate, and phosphate (in order of solubilities). Fifty-two per cent of the total cations leached was Ca. In every case, the use of Uramon decreased the pH from that of the original soil.

In another experiment using the same soil to which equivalent rates of fertilizers (NPK) were added, information was obtained on the amount of Ca removed from the soil by leaching and in crops in relation to the amount added in the fertilizers. Two hundred pounds of nitrogen per acre were applied; 15 sources of N were studied. In general, the organic (castor pomace, linseed meal, fish meal, cottonseed meal) lost somewhat less lime in the crop and leachate than did the

inorganic fertilizers (ammonium sulfate, ammophos, potassium nitrate). Exceptions are cyanamid, Ca nitrate, and no nitrogen fertilizer which ended the experiment on an annual basis of 646, 162, and 28 pounds of lime, respectively, in excess of the amount of lime leached from the soil. This follows in general the acidity-basicity relationships of these fertilizers.

5. Sprays and Dusts

Use of sulfur fungicides for spraying orchards acidifies soils. Elemental sulfur sprays and dusts have largely taken the place of lime-sulfur sprays because of their better eradicative action. Boynton states that the average annual uncompensated sulfur applied to some apple orchards ranges from 10 to 12 pounds per tree (270 to 324 lbs/A). Since 1 pound of sulfur will leach approximately 3 pounds of lime out of the soil, about 30 to 36 pounds of lime per tree (810 to 972 lbs/A) would be required to counteract the potential acidity of the sulfur. The greatest acidity has been found to occur in the branch-spread area of the tree or about 10-12 feet from the trunk. In one apple orchard, planted on a Dunkirk silty clay loam, the soil was below pH 5 to about an 18-inch depth and increased to above pH 5 at greater depths.

Nutritional Problems of Peanuts . . .

(*From page* 10)

exception of their phosphorus content) they might have been two soil samples from the same field. The chemical analyses indicate the soils in both fields to be critically low in content of both calcium and potassium.

The data in Table IV-B show that in 1949 the response to lime and gypsum on these two soils was quite different. The essential difference in the treatment of the two soils was the amount of potash applied to the fertilizer. Test No. 18 gave no increase in yield from either lime or gypsum. This test was fertilized with 400 pounds per acre of 4-10-7 and had a total available potash (i.e., exchangeable soil potassium plus 28 pounds of potash applied in the fertilizer) of 65 pounds per acre-plow-depth. Test No. 19, which had a total of 133 pounds per acre of available potash, approximately one-half of which was supplied by the extra 100 pounds per acre of muriate of potash, gave yield increases of approximately 50 per cent from the gypsum-treated plots. The difference in response of the two soils was due to the difference in the amount of potash applied to the peanuts. Lime was applied to both tests on February 8, 1949. This was apparently too short a time previous to planting peanuts for the lime to have given its full effect. The somewhat smaller values for both yield and percentage of SMK for the no-treatment plot of test No. 19 should be noted.

Peanuts were grown on location No. 18 again in 1950. They followed lupines, which were heavily fertilized with an 0-14-10 fertilizer, and the fertilizer to peanuts was higher in potash than that used in 1949. Large increases in yield were obtained from all three lime and gypsum treatments in 1950. In fact, the yield of sound mature kernels was more than doubled by all lime and gypsum treatments, whereas no response whatever was obtained the previous year. The test was on the same plots but with only the gypsum treatments of 400 pounds per acre being repeated in 1950. These results provide one explanation for the statement, "No two peanut experiments give the same response and the same experiment will not give the same response two years in succession!"

TABLE IV-B.—RESPONSES OF RUNNER PEANUTS TO LIME AND GYPSUM AS AFFECTED BY THE POTASH AND FERTILIZER USED.

Test no.	Fertilizers used	Soil treatments			
		No treatment	1 ton per acre lime	400 lb. per acre gypsum	Lime and gypsum
19	300 lb./A 4–10–7 plus 100 lb./A 60% KCl				
	Yield in 1949—lb./A	1,186	1,257	1,834**	1,750**
	Increase in yield—lb./A	check	71	648	565
	Percentage of sound mature kernels	60.9	67.7	68.8	68.8
18	400 lb./A 4–10–7				
	Yield in 1949—lb./A	1,322	1,289	1,328	1,235
	Increase in yield—lb./A	check	−33	6	−89
	Percentage of sound mature kernels	67.8	68.8	67.1	71.4
18	820 lb./A 0–14–10 to lupines				
	200 lb./A 0–14–10+100 lb. 4–10–7 to peanuts				
	Yield in 1950—lb./A	868	1,567**	1,385**	1,528**
	Increase in yield—lb/A	check	699	517	660
	Percentage of sound mature kernels	51.5	66.1	68.7	72.1

** Highly significant increase in yield over no-treatment plot yield.

A comparison of the yields and percentages of sound mature kernels for the no-treatment plots shown in Table IV-B indicates that potash applied to soils low in calcium decreases the yield and lowers the quality of peanuts. In 1949, the average weights of green peanuts on the untreated check plots of tests Nos. 18 and 19 were identical. The green peanuts from test No. 19, which received 53 pounds per acre more potash, lost 156 pounds per acre more upon drying. Thus the yield of dry peanuts was decreased by larger amounts of potash. In addition, the peanuts from the higher rate of potash had a percentage of sound mature kernels 6.9 less than those from the lower rate of potash. On the other hand, the additional potash increased the yields on the plots to which adequate calcium was supplied in the form of gypsum. The comparison between yields and percentage of SMK for the two years' data on test No. 18 shows the same relationship. Pronounced visible differences in the number and size of peanuts on the vines of the untreated plots as compared to those that received lime or gypsum existed at the time the peanuts were dug in 1950. While plants from the no-calcium check plots had set more peanut pods, most of them were small, undeveloped, or empty.

Similar effects of increasing the potassium supply by sidedressings of potash or by larger applications of fertilizer were evident in the data from three other tests located on soils low in calcium. The results of all these tests indicate the necessity of supplying both calcium and potassium to soils low in these elements in order to obtain the expected increases in yield of peanuts, as well as to avoid actual decreases in yield when the use of potash or of mixed fertilizer is increased. It appears probable that the yield of runner peanuts on low-calcium soils can be considerably increased by the use of optimum amounts of potash in conjunction with applications of lime or gypsum on such soils. Low levels of both calcium and potassium in the soil are undoubtedly the major nutritional reason for low peanut yields on many of the soils of that area.

It is doubtful, however, that the use of satisfactorily balanced amounts of

calcium and the major fertilizer elements will produce maximum peanut yields on all soils. Of the soils tested in this work, two have given negative responses to lime and gypsum even when additional potash was applied. The magnitude of this negative response approached statistical significance. It is not at present known what other, if any, nutritional element was deficient. Whichever it may be, its need by the plant appears to be intensified by liming and by increasing the calcium supply in the soil.

Information obtained on over-limed soils may possibly be related to these soil conditions. A number of small, seriously over-limed areas have been encountered in this section. They have usually resulted from lime having been bought in bulk and piled in the field before being spread. Two such areas were selected for study and treatment in June 1949. One was in peanuts and the other in corn. The over-liming effect was so severe that both crops were complete failures on the affected areas. No response to treatments applied in June was noted for either corn or peanuts in 1949. In

Fig. 3. Showing typical set of peanuts by representative plants from plots receiving muriate of potash alone and muriate of potash plus zinc sulfate on an over-limed area (soil pH values 7.85 and 7.35, respectively). Photographed September 18, 1950.

TABLE V.—TREATMENT AND RESPONSE OF RUNNER PEANUTS ON AN OVERLIMED SOIL AREA.

Treatment		Yield of dry peanuts		Percentage SMK	Soil reaction 9/28/50
Materials applied June 7, 1949	Rate per acre	Yield per acre	Increase per acre		
	Lb.	Lb.	Lb.	Pct.	pH
Muriate of potash only	100	714	651	64.9	7.35
Muriate of potash and borax	100 5	544	481	62.5	
Muriate of potash and manganese sulfate	100 25	194	131	59.4	
Muriate of potash and A–Z mixture*	100 *	1,804	1,741	70.5	7.85
No treatment—check	—	63	check	49.9	
Muriate of potash and zinc sulfate	100 15	1,390	1,327	68.1	

* The A-Z mixture consisted of 5 lb. borax, 5 lb. copper sulfate, 15 lb. zinc sulfate, and 25 lb. manganese sulfate per acre.

1950, corn and peanuts were rotated on each field. The corn in 1950 showed marked improvement in the rows on which muriate of potash and four minor elements had been applied in 1949. The deficiency symptoms of corn on adjoining untreated rows were corrected by a foliar spray of zinc sulfate.

Peanuts growing on the other area in 1950 showed almost complete recovery from the over-liming effect on rows to which 100 pounds per acre of muriate of potash and 15 pounds per acre of zinc sulfate had been applied in June 1949. The treatments had been applied to two rows in the middle between the treated rows and every alternate two rows left as untreated checks. A hundred-square-foot plot from each treated row was dug for yields. The yields from the different treatments are given in Table V in the order in which they occurred in the field. Photographs showing the responses to the different treatments are reproduced in Figures 1, 2, and 3.

Calling All Crops . . .

(*From page* 5)

Parity cannot restore soils by itself nor can it ever take the place of lost relatives. Like prices and markets, good or bad, parity is not the same to all farmers. But bountiful crops usually pay out in both purse and pride, if and when coupled with practical application of long-known ways to maintain fertility.

Besides, a bumper harvest and a full storage of well-balanced food and feed crops are equally beneficial to city consumers. They are far better off on good wages to pay a slight premium to the farmer than to let prices be driven down and have the reservoirs of production dried up.

I think it is clearly such a basis of preparedness-for-the-worst in agricultural planning which is going to benefit us much, even if we do not founder on the rocks of a world struggle. We do not vision any surplus pile to defeat our efforts anyhow, either in war or in peace. As long as our industries remain geared to full-steam-ahead, the market place is going to render to Caesar the things which belong to Caesar. And we won't need a parity formula to make production worthwhile.

In making known the 1951 production guides, the farm planners consulted the state leaders and then laid out certain targets for several basic crops. No guides were suggested for any class of livestock or in terms of meats, eggs, wool, and milk. Everyone took it for granted that keen consumer eating habits would dictate a good high level of animal products as desirable.

Hence instead of outlining livestock and poultry guides, the easy but indirect method was used. Emphasis was laid on corn, barley, oats, and other cereals and on hay and pasture improvement. One couldn't forget the end-use of the bulk of our cereals, headed direct to the feed lots. Neither could one overlook the necessity for keeping a sound balance, so that livestock and poultry production should not deliberately run far ahead of the available harvests of grain or the abundance of seasonal pastures.

Right along with the current crop enhancement drive there is also a look-ahead notion. Rash and wasteful practices of land treatment and bad tillage methods in a mad effort to get high yields and big returns for 1951 could easily catch up with us and blacken the outlook for making succeeding seasons bountiful ones. Thanks to our earnest, experienced farmers and the extension educators and commercial representatives in the field, this hint to protect the future is widely and

wisely accepted and applied. No more repetition of the scavenger farming and cream-skimming exploitation systems that hurt us so in World War I is likely to prevail. Would, however, that we had legal power to halt the gambling instincts of some city plungers, who avidly seek such pretext to ravish and destroy the topsoil and sell our land legacy for a shady farthing.

Such stay-at-home wastrels who skulk and scheme to skin the soil are as much subversive characters as are the atom bomb traitors. A minority of our land wreckers are just ignorant, and unworthy of a chance to farm.

If perchance we fall a trifle below the guidebook in acreage planted to soil-depleting cereals, let's not look back too hard to the old AAA specifications right after the processing tax was ruled out. They then began to put emphasis through benefit payments on balanced conservation farming—grass husbandry.

This logic has gained ground because it is sound. Grassland improvement means better fertility at cheaper costs and it spells easier and less expensive rations for livestock. It also saves hard and costly labor, if modern curing, hay-chopping, and hay-keeping ways are utilized.

SO I can't get terribly upset or feel down in the gizzard if it develops that some missing corn or oats acreage bobs up as good pasture, meadow, or hay land which was too well established to plow. In these times of high farm expenditures and big wage outlay it may seem the best and wisest and most logical plan to adhere to a high degree of forage crops, other things being equal.

I surely do not partake of the anxiety or misplaced fears expressed by some newspaper scribes in my territory, who when writing about the campaign for more crops stated flatly that a drop of a couple of million acres in corn might influence the next national election. I'm afraid that's not worth a puffing comment from a Missouri corncob pipe. It'll be the pork-hungry consumers of 1952 who might nurse a grievance—but their memories are too short to last in a world so fraught with other disturbances.

Nevertheless, farmers figure that we can't take any too many chances betting against weather and borers, so I look to a firm upward push in their late winter corn-planting intentions. Even with a couple of stray million acres below the 90-million-acre goal, we can bet that the use of adapted hybrids and tons of mixed plant food plus power cultivators and chemical weed-killing agents will pretty nigh fill the cribs and silos.

OAT seeding and early land preparation were badly delayed in many Midwest sections this spring, so some of the land which misses the oats will be planted to corn and soybeans—maybe some barley here and there. The April farm-storage reserves of oats were almost a top record, so if we slight them a little it won't make as bad a dent in livestock rations as a corn failure would.

Soybeans are another "must" crop. Three-fourths of the 1951 soybean acreage will be planted to eight new improved varieties which yield highly and do not lodge much. Fully three bushels an acre extra harvest is almost a guarantee through use of any of the better soybean sorts. Their oil and protein content both exceed some of the older varieties.

When the April crop report hit the newsstands one could believe by some of the scare stories that we might have to import some breadgrains. It's queer how easy the reporters can find a horror yarn in agriculture. And they surely make the most of it when Kefauver is taking a vacation and things get dull in urban crime waves.

What about wheat anyhow? Well, with no further serious setbacks, the total wheat production and supply outlook for 1951 is by no means a source of alarm. Because of an adequate over-all reserve and the chance that we

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will grow another billion-bushel crop, barring natural hazards, there is apt to be enough wheat for our normal domestic needs, plus a reasonable volume left for exports.

The production guidebook asked for a safe top goal of about 1,150,000,000 bushels. This won't quite be reached, based on present field estimates. The crop of last season was 1,027,000,000 bushels.

The April 1 estimate of winter wheat production this year amounts to 727 million bushels. This was shy about 170 million bushels of the total estimated last December, before the drought, bugs, and abandonment took toll. To this prediction we can add about 309 million bushels likely to come from spring seedings. This is based on the March 1 planting intentions.

If this guess which is figured on average yields for five years turns out right, it would stack up to 1,036,000,000 bushels of new wheat for 1951. The July carryover last year was 423 million bushels, which is about twice the carryover volume before the last war. Now they forecast a carryover for next July amounting to 420 million bushels. If we tack that onto the expected production of new wheat, we would get somewhere near 1,400,000,000 bushels, more or less.

Against the estimated supply we figure out the requirements. Food, feed, and seed wheat for home use foots up to 750 million bushels. Exports are an unknown quantity, but just to make things fairly safe, the outbound wheat for next season is placed at 300 million bushels. This takes care of the international agreement quotas too. If this turns out right, the total 1951 supply as estimated in a conservative way would cover the disappearance of 1,050,000,000 bushels, with a little to spare. So far it's hope rather than certainty.

Yet the present dilemma revolves around the extent to which we may be called upon to relieve hunger abroad

by wheat and other food cereals. India is knocking hard on our door, and Congress seems apt to grant them extra supplies from our pile—maybe nearly 70 million bushels. Already for the March through May period, India has bought and paid for about 35 million bushels of all food grains combined. Our exports of good grains in that period totaled 200 million bushels.

Down Dixie way the fiber farmers are all set to grow bumper bales to beat the weevil. Bolstered by an unusual "scarcity of surplus" and price-protected both by government supports and a soaring market demand, the term "planter" will surely fit the Southern farmer as never before. That goal of 16 million bales will probably be more than attained, unless unforeseen disaster occurs. More fertilizer will be pumped and soaked into the soil to make the cotton crop than history has ever recorded.

AND so the plot thickens all along the farm front. By virtue of a year of positive programs reinforced by able leadership and the world's most intelligent and resourceful land army, we shall see agriculture hit the high spots from April to November. There is even some dim hope that even the astounding achievements of the late war years will be surpassed.

What farmers can do in a year of destiny will soon be proven. But what they will do meanwhile to preserve their own health and the health and vigor of their land is subject to careful thought and purposeful resolve.

There will be mistakes, overwrought and wasted zeal, old men forced to resume where young men left off, some discouragement and plenty of backaches and brain storms. But above the typical griping and the sarcastic comments of an embattled Americanism there will surely emerge many deep layers of the fat of the land, heaved up and distributed to the hungry in a time of pressure and peril.

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Request bookings from your nearest distributor

Two small-towners were sitting on the front porch of a general store when a city slicker drove up in a flashy convertible. "Hey, you," yelled the driver, "how long has this town been dead?"

"Can't be long," drawled one of the natives, "You're the first buzzard we've seen!"

* * *

Seaman: "Shall I leave the dim lights on?"

Wave: "No. Turn the dim things off."

* * *

Major: "You were absent from the parade, any explanation?"

Private: "Yes, sir, a mule kicked the Sergeant in the head and I had to fix it."

Major: "Fix what?"

Private: "The mule's leg, sir."

* * *

"Which would you rather give up—wine or women?"

"It depends on the vintage."

* * *

They were most anxious not to be recognized as newlyweds so before they went in to the hotel to register, they shook off the last of the rice and the bride took off her corsage.

Then sure that no one would know they had been married just that morning, the groom said casually to the desk-clerk:

"I'd like a double bed with a room, please."

A beginner at golf, when asked how he came out on the first day on the links, replied that he made it in eighty.

"Eighty," ejaculated his friend; "that's really remarkable. Most old-timers would envy you with that score. You'll surely be an enthusiast from now on."

"Yes," said the novice condescendingly. "I'm going back tomorrow to try the second hole."

* * *

Missus Mandy Johnsing, surrounded by her brood of eleven or thirteen pickaninnies, was talking to the spinster settlement worker. "Yes 'em, birth control am all right fo' you all, but me, ah's married and don' need it."

* * *

Have you ever stopped to think what a wonderful thing the human brain is? It never ceases working for you from the time you are born until the moment you stand up to make a speech.

* * *

"I'm a bit worried about my wife," said Brown. "She was talking in her sleep, and saying: 'No, Frank, no, Frank!'"

"Well, what are you worrying about?" demanded his friend. "She said, 'No,' didn't she?"

* * *

Old Lady: "My word! Doesn't that Little Jones boy swear terribly?"

Little Joe: "Yes'm he sure does. He knows the words all right but he don't put no expression in 'em."

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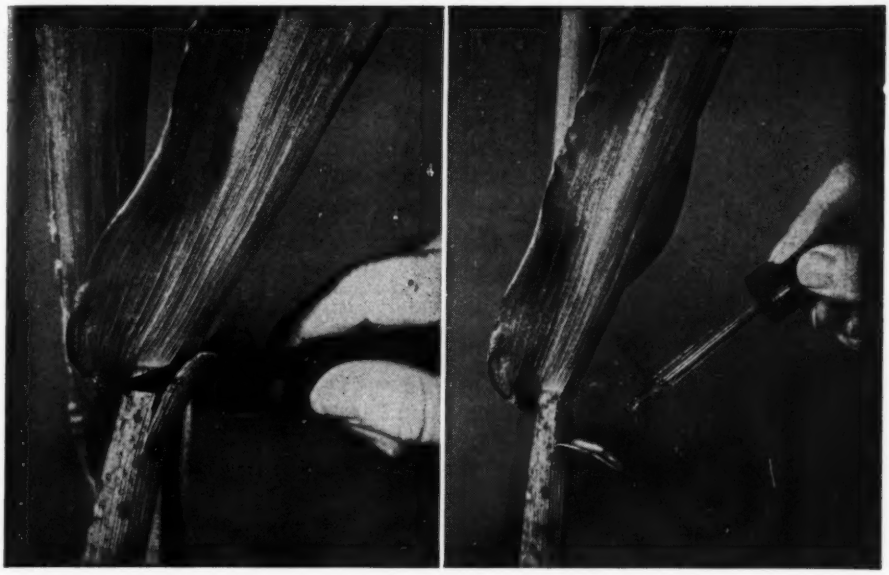

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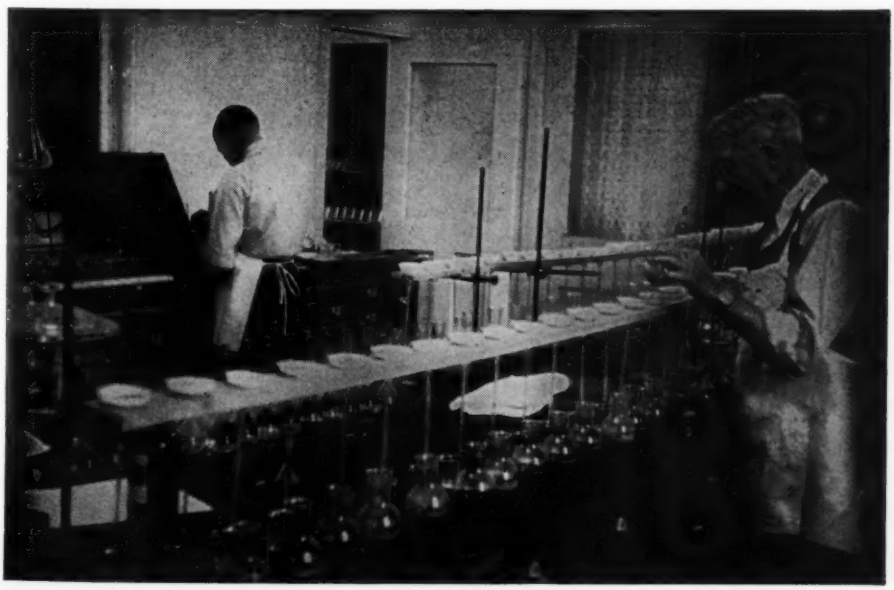

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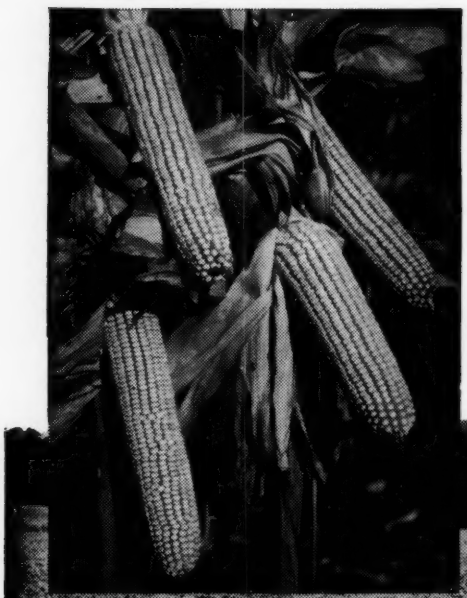

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